Preventive dentistry
Revision lesson

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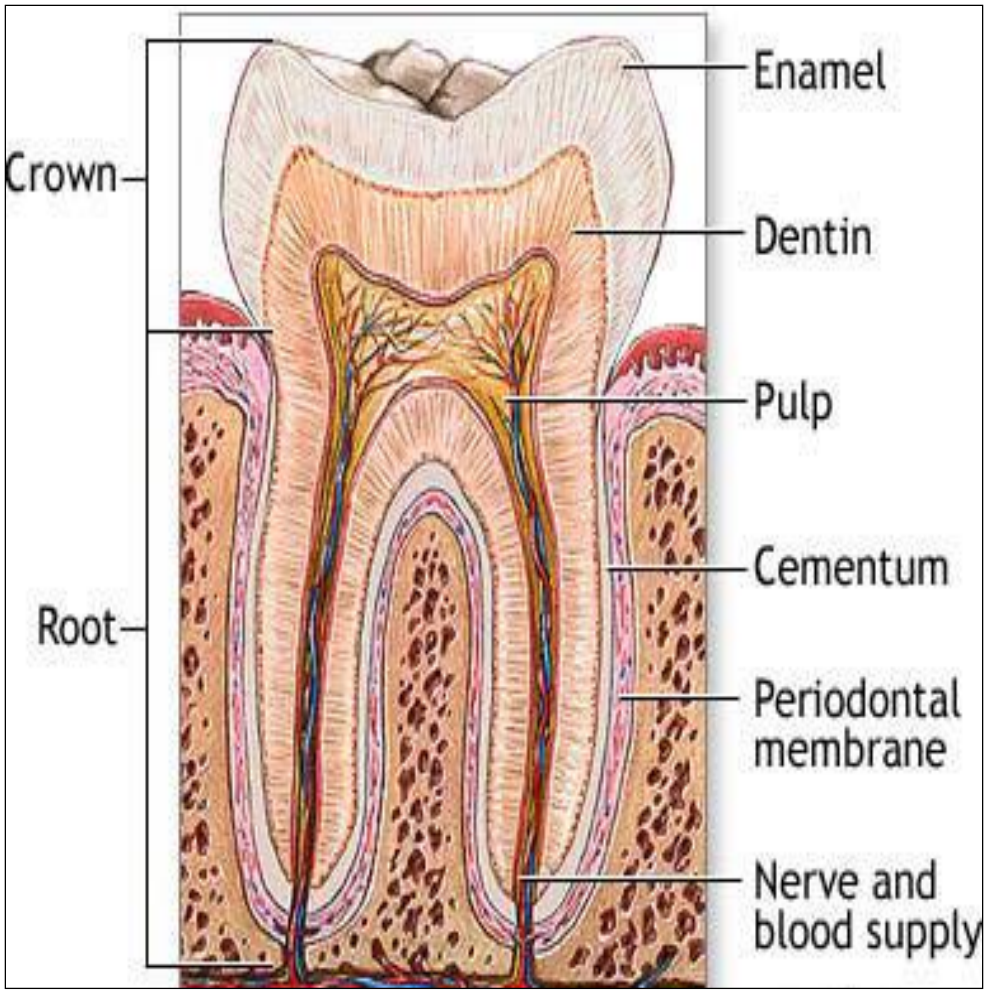
FAKULTNÍ NEMOCNICE U SV. ANNY V BRNĚ

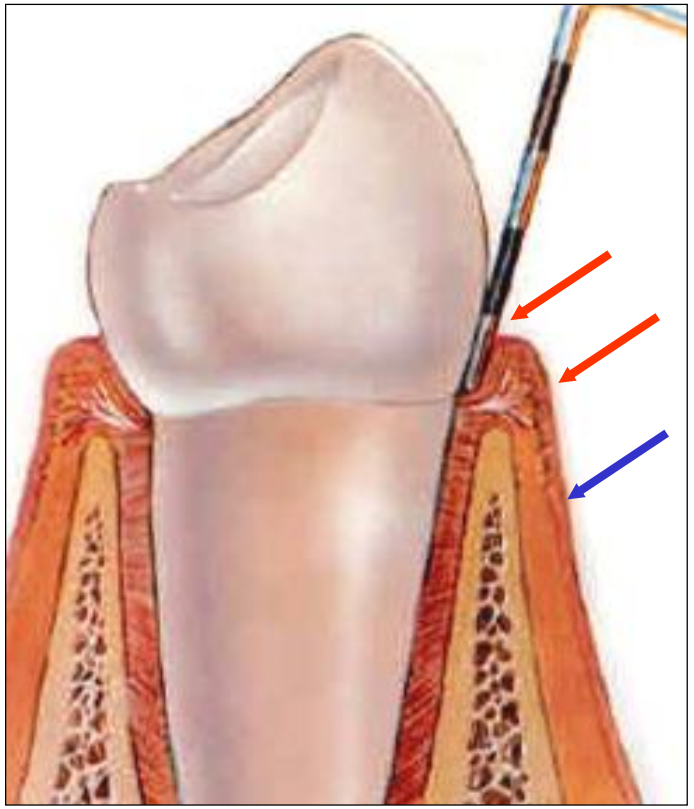
MUNI

Periodontal tissue

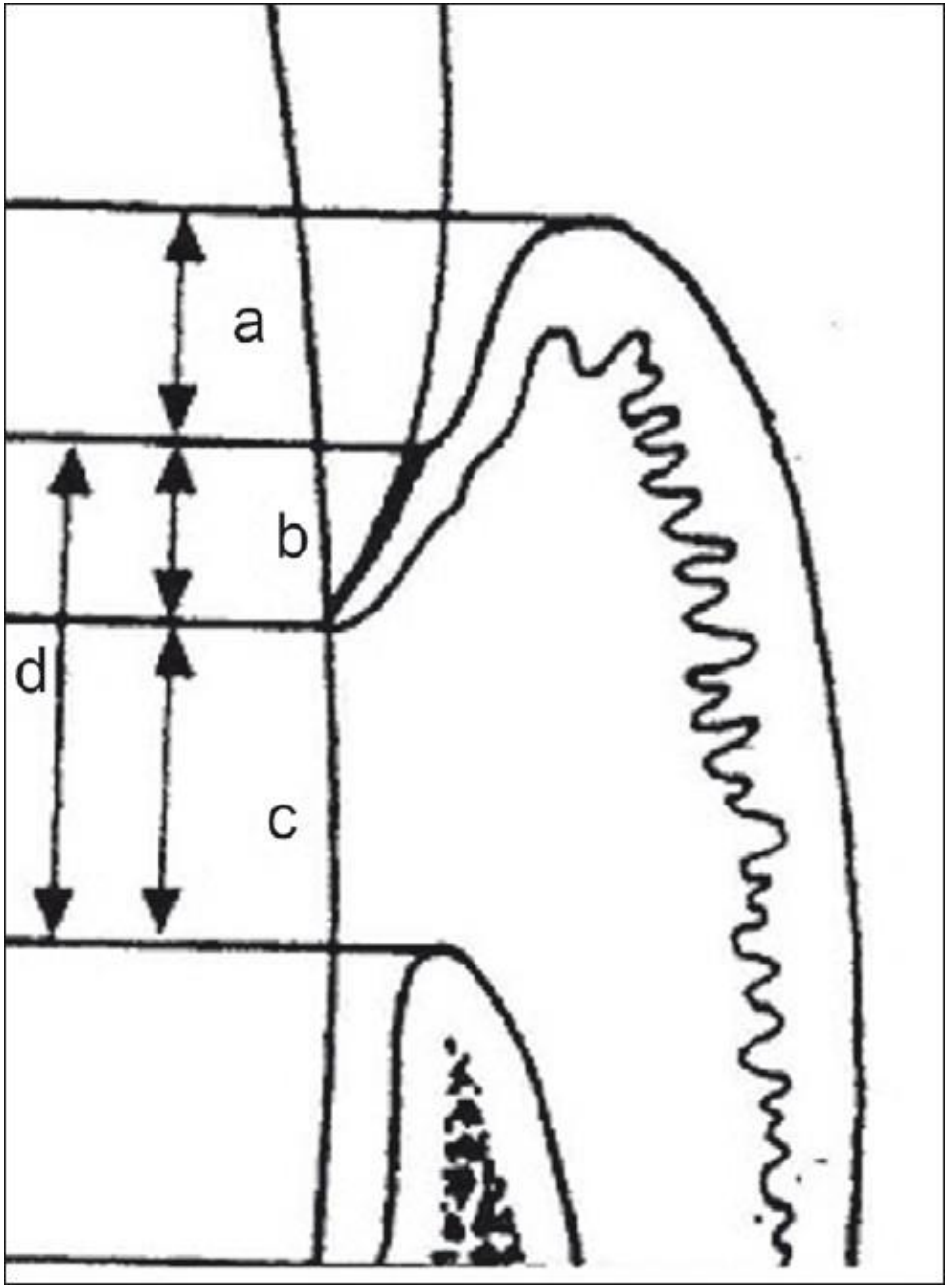
- Gingiva
- Periodontal membrane with periodontal ligaments (fibers)
- Root cementum
- Alveolar bone (tooth socket)



- GINGIVA
  - is one portion of the oral mucosa
  - covers limbal part of the alveol



- Free gingiva
  forms a rim around a tooth neck
- Sulcus gingivalis – gingival fluid
- Dentogingival junction
- Interdental papila – fills the interdental space
- Attached gingiva - to the subgingival structures, mucogingival line
- Plexus gingivalis



Biological width

- b+c /d
- 3 mm

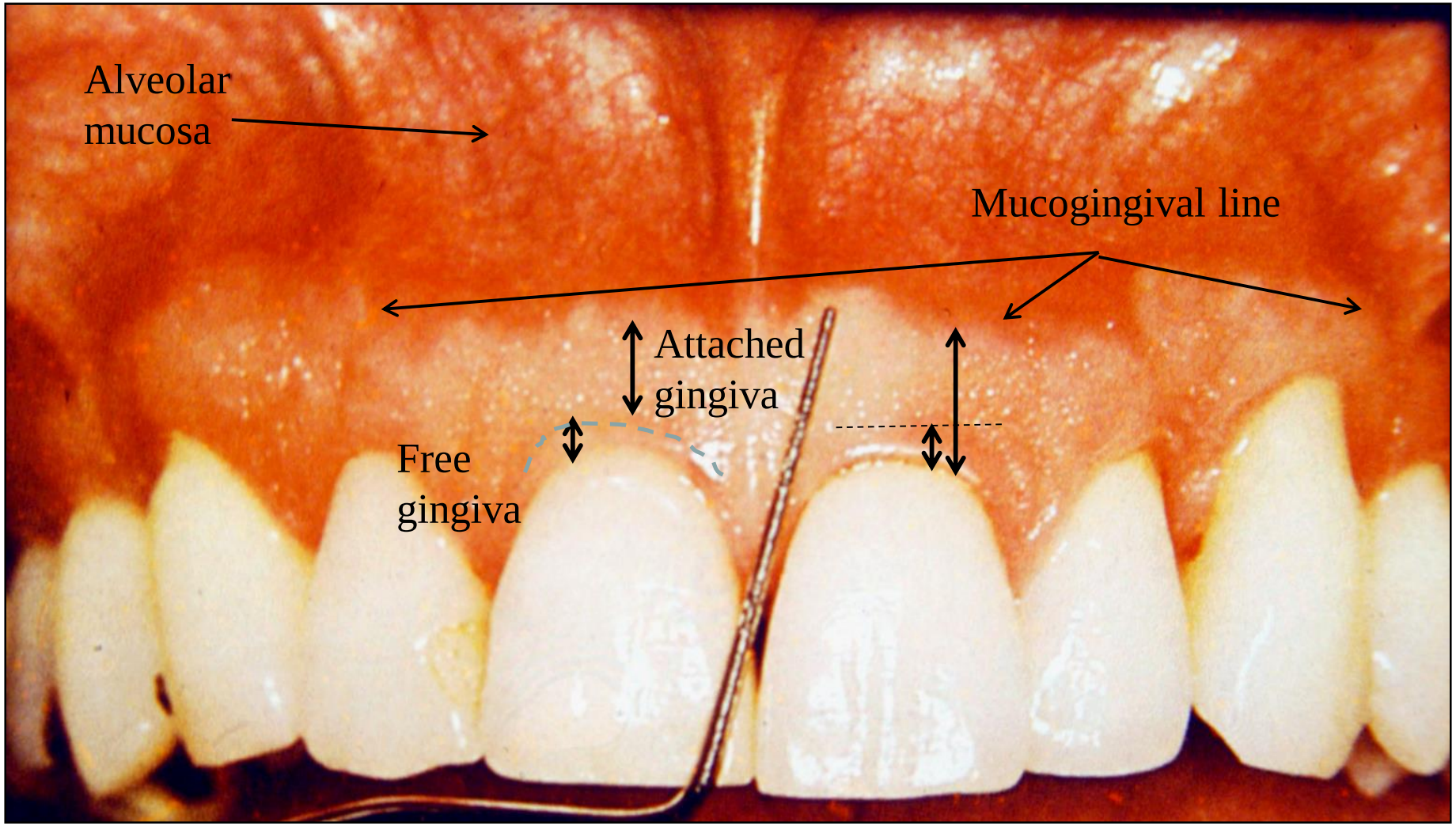
a - sulcus gingivalis

b - junctional epitelium

c – connective tissue attachment (supraalveolar fibers)

Healthy gingiva

- white/pink color
- stiff consistency
- stippling
- relativly firm
- no bleeding



It is needed to protect the neck of the tooth

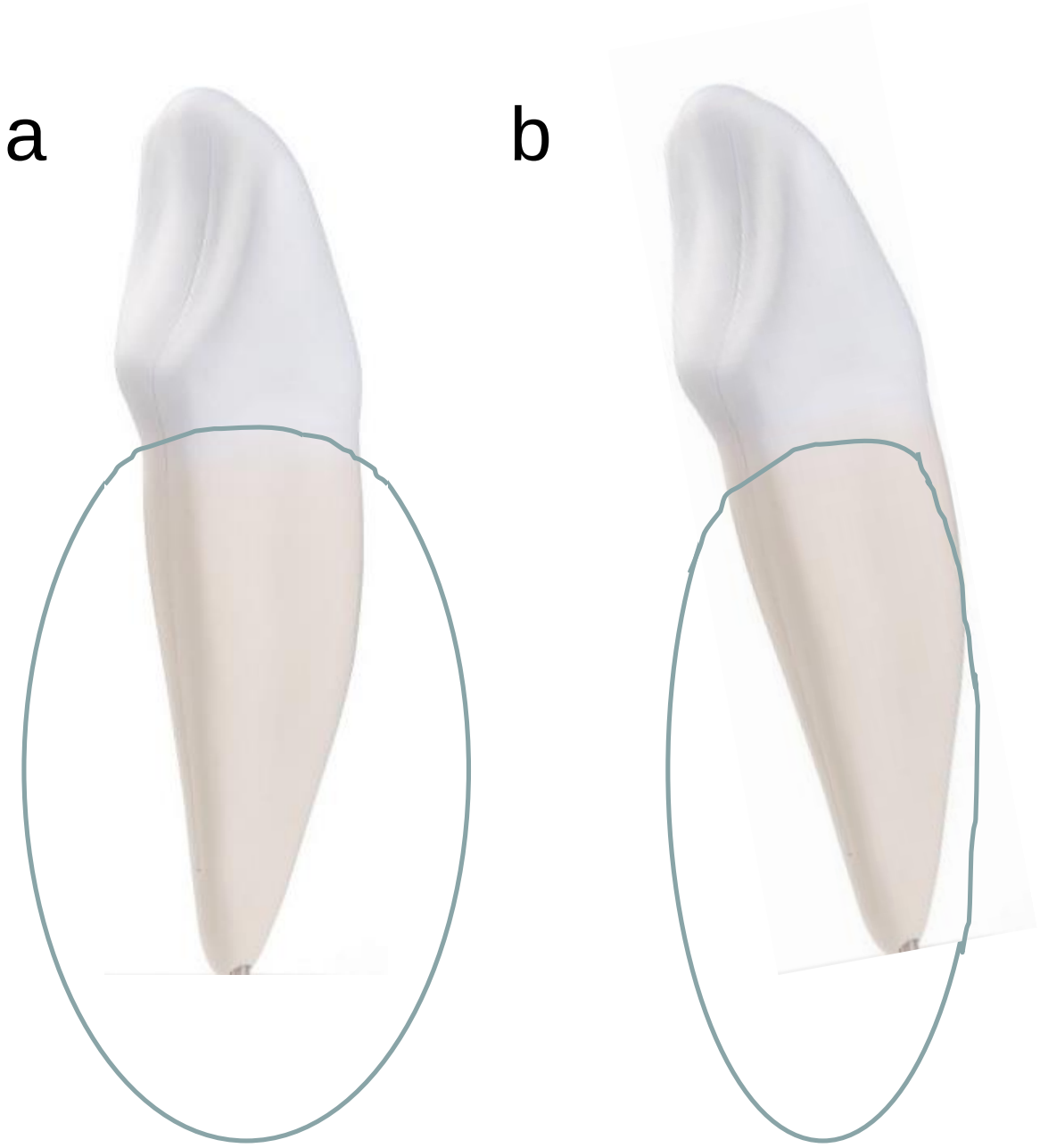
1 - sufficient width of the attached gingiva (minimum 1-2 mm)

2 - strong (thick) or moderate gingival thickness

- Gingival thickness – strong, moderate, thin

Shallow lower vestibulum
(insufficient width of attached gingiva)

Thin gingival phenotype, gingival recession in tooth 41 - consequence of piercing



Tooth position in the alveolus:

a - the best

b - thin vestibular lamella

b - bone fenestration/ dehiscence vestibularly

Vestibullar lamina is intact

Fenestration of Vestibullar lamina

Dehiscention of Vestibullar lamina

Physiolo-gical

Gingival

Papillary

Passing through the papilla

"High frenulum attachment"

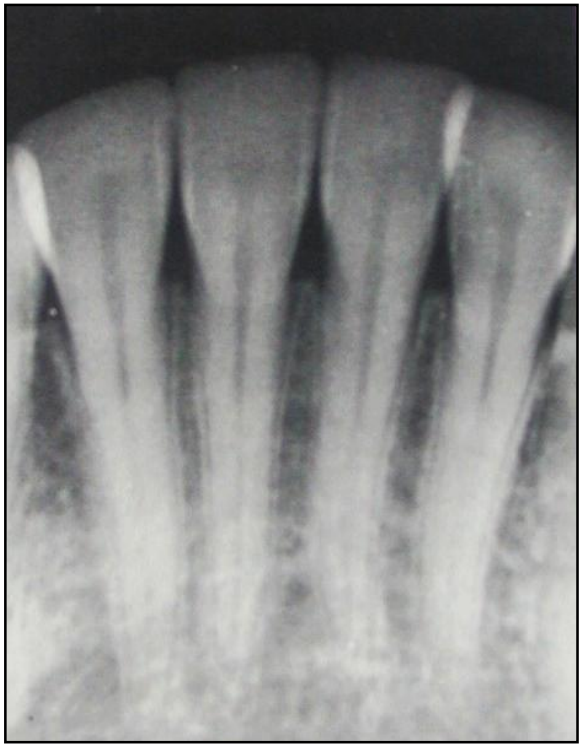
- pulling
- papillary anemization under pressure on the frenulum

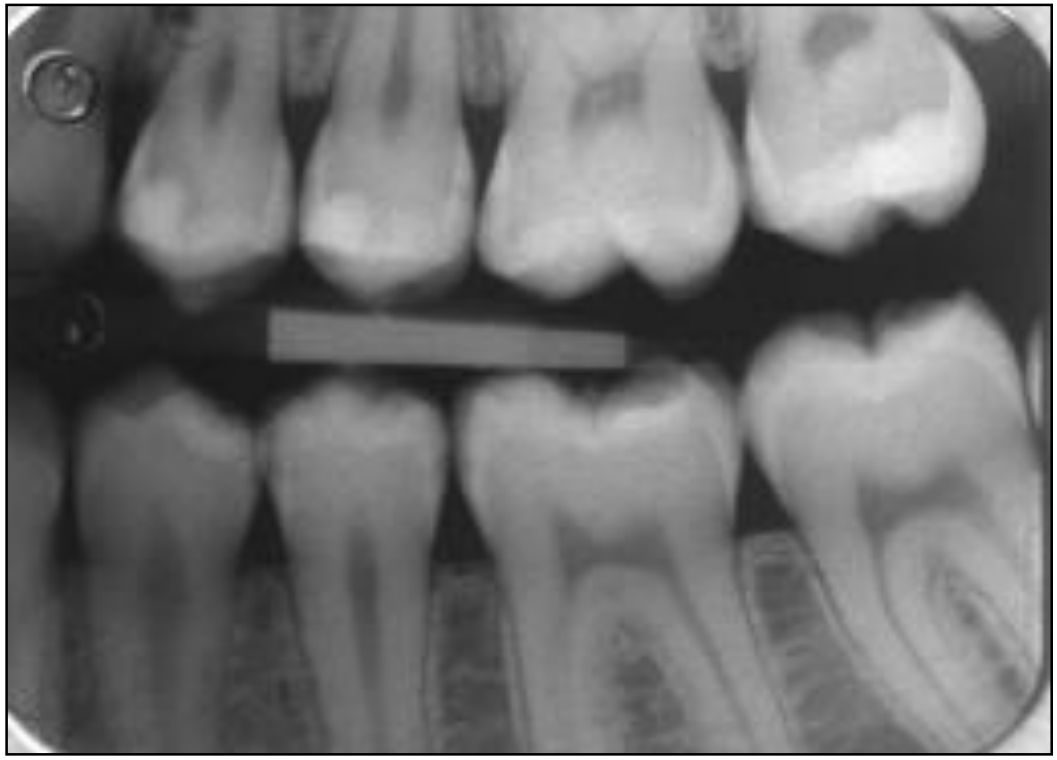
- movement of the papilla and marginal gingiva under pressure on the frenulum

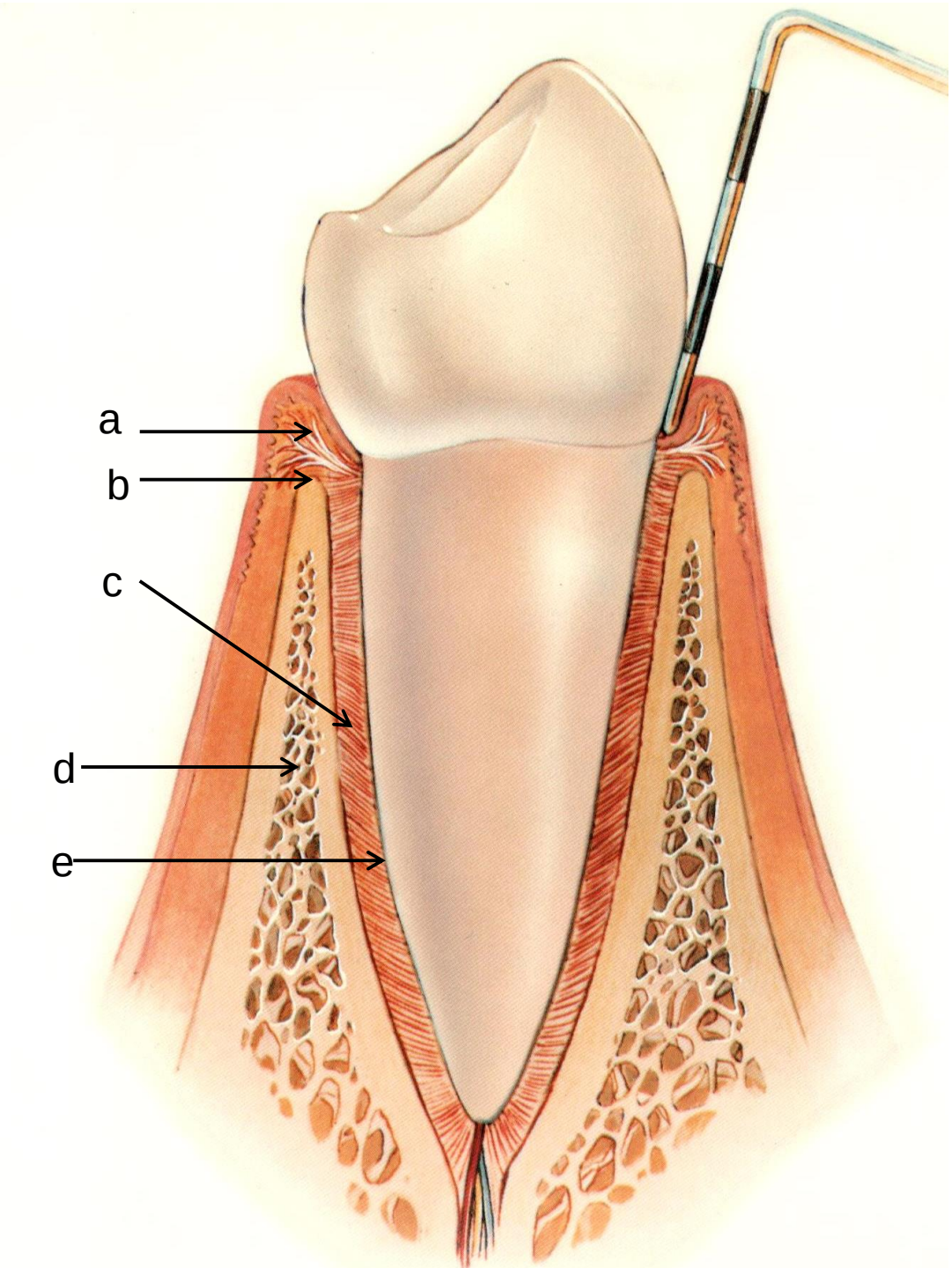
What type of frenulum is this?

Radiologicaly healthy periodontium

- lamina dura is present
- distance CEJ - margin of alveolar bone 1-2 mm

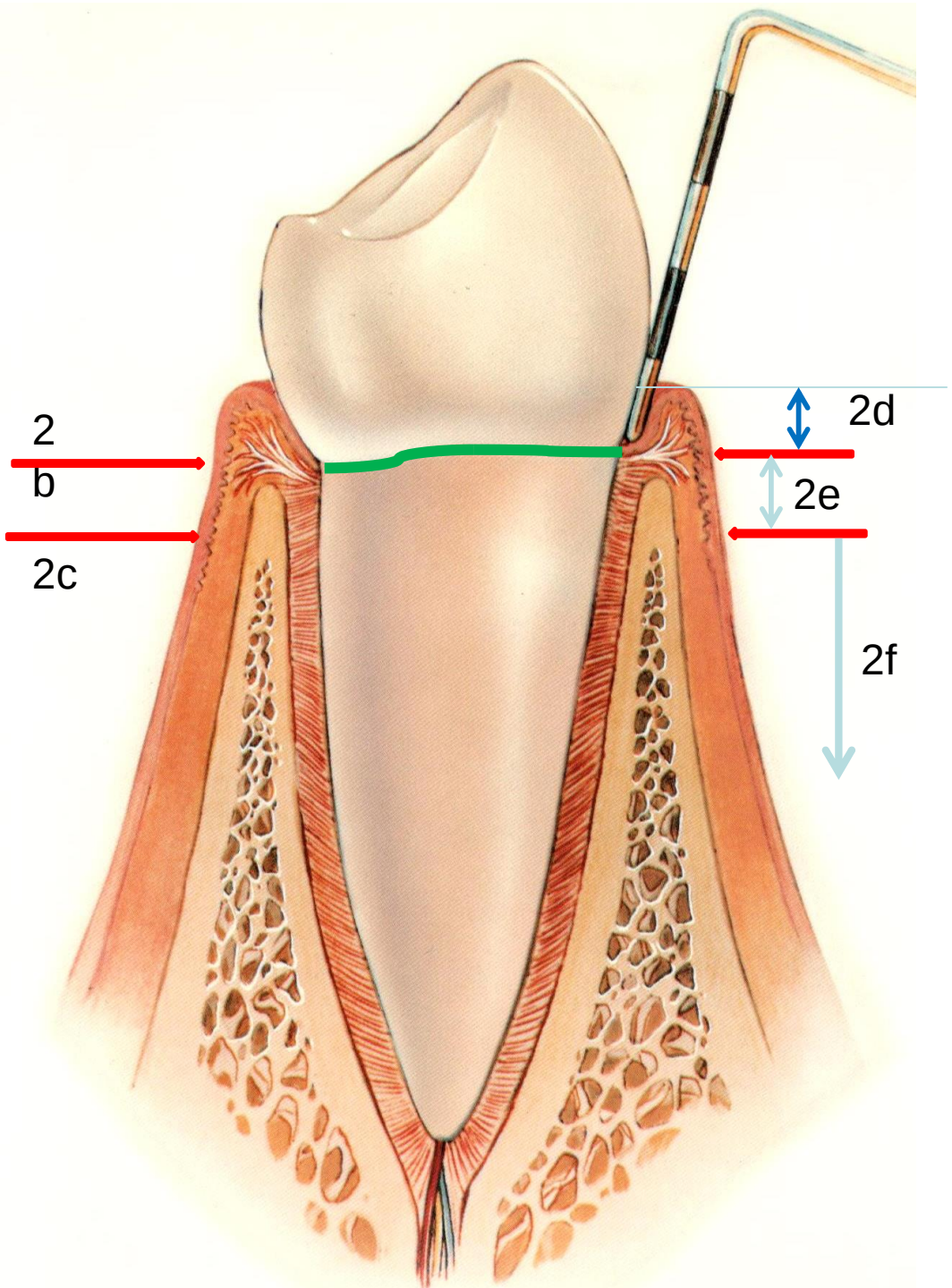






List the anatomical structures that are part of the periodontal tissue:

1a
1b
1c
1d
1e

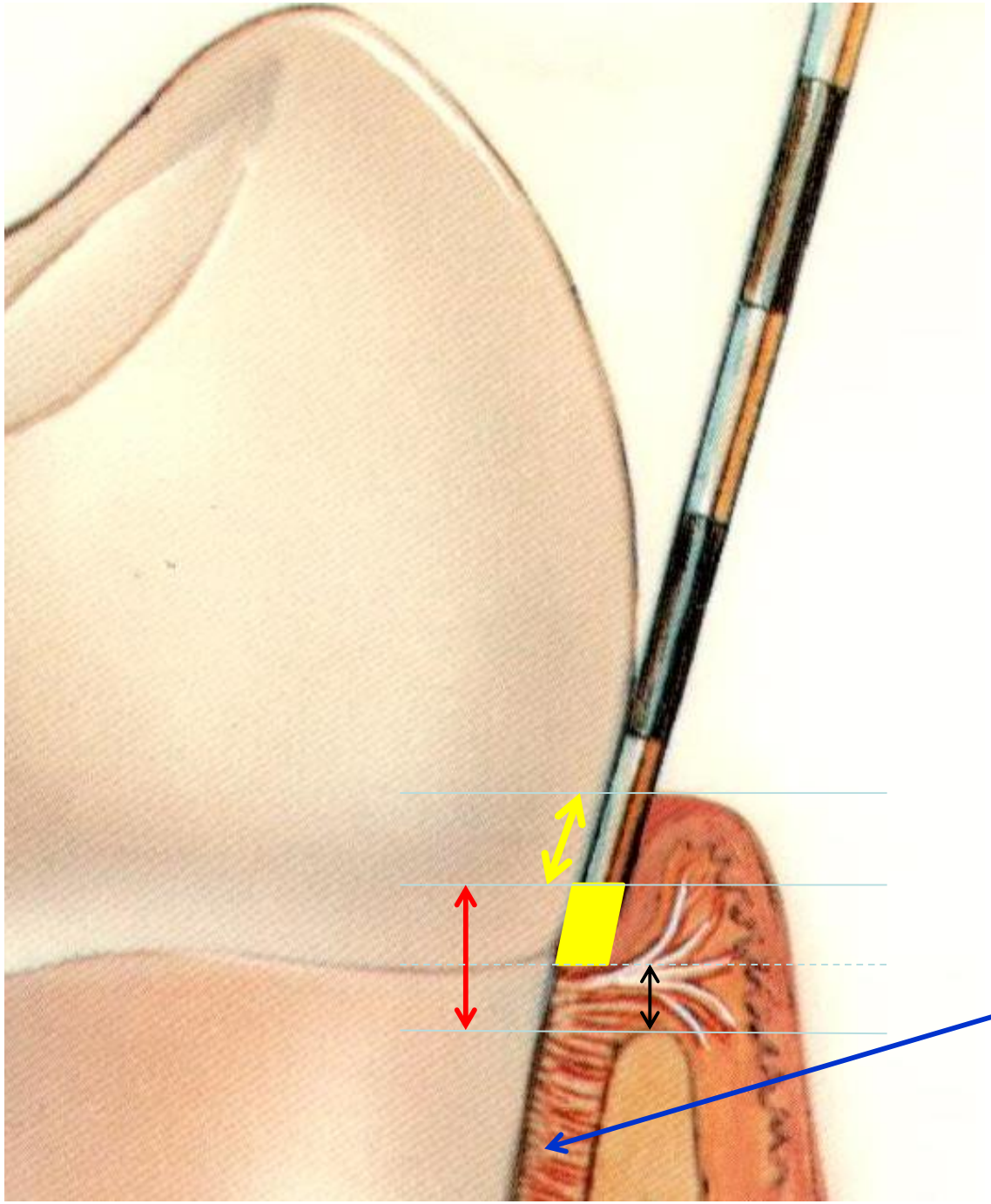


2 - List the anatomical structures within the range:

2a - green line

2b, c - red lines, there are particularly visible when viewed from the vestibulum

2d, e, f - structures within the blue arrows



List the anatomical structures within the range:

3a - yellow arrow

3b - yellow field

3c - red arrow

3d - black arrow

3e - blue arrow

Materia alba vs. DENTAL microbial PLAQUE

Materia alba

- Collection of debris (not biofilm !)
- A white cheeselike accumulation of food debris, microorganisms, desquamated epithelial cells, and blood cells deposited around the teeth at the gumline

DENTAL microbial PLAQUE

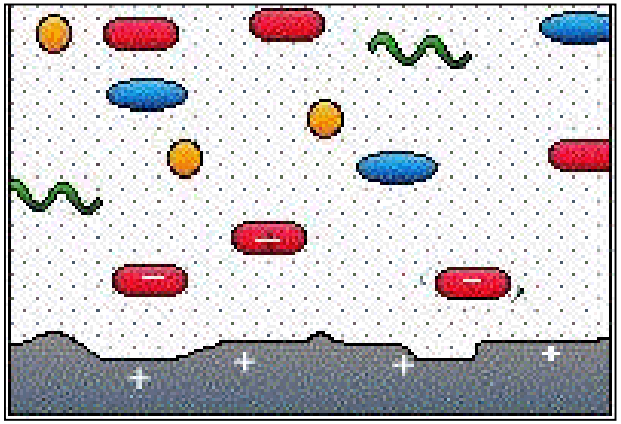
- Composed of bacteria in a matrix
- Microorganisms (75 %) a their products
- Matrix (25%)
  - bacterial (extracellular polysacharids) and salivary origin (salivary glycoproteins and mucopolysacharids)
  - calcium, phosphates (mineralization of plaque)

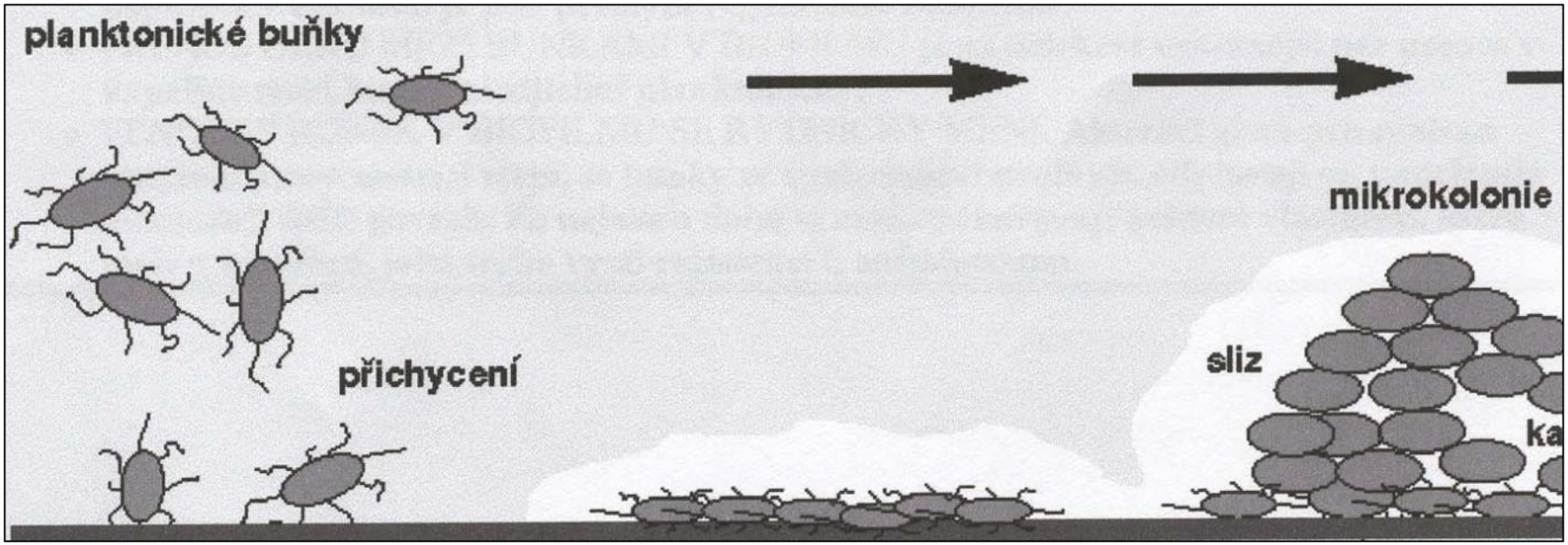
- DENTAL microbial PLAQUE

- microbial community
- coexistence of different populations in the biofilm
- bacteria communicate in different ways (coagregation, adherence, provid nutrients, exchange of genetic material)
- this symbiosis gives new features and greatly increases the resistance of dental plaque
- can be removed by mechanical means only

Plaque Formation

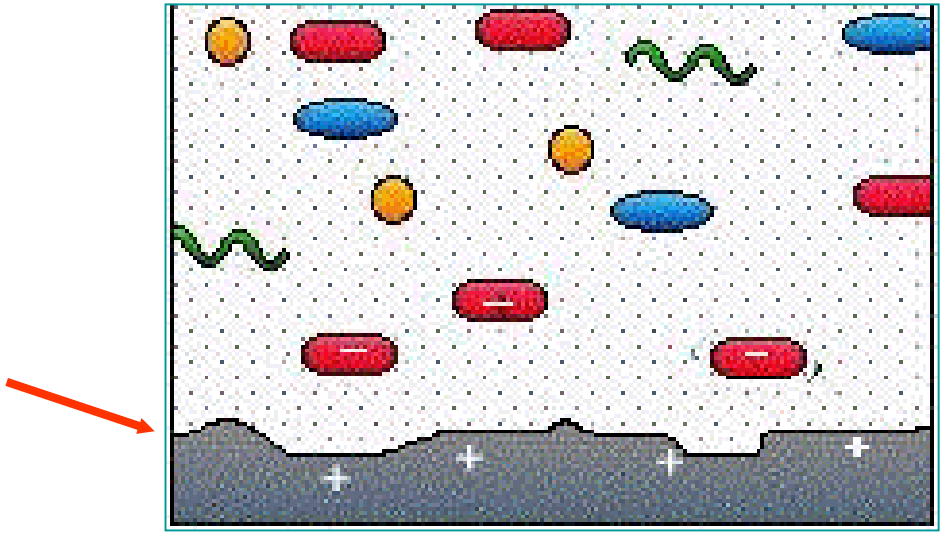
- Acquired Pellicle Formation
- Primarily Bacterial Colonization
- Growth of Plaque (sec. colonization)
- Maturation of Plaque





1/ Plaque Formation

- Acquired Pellicle Formation
  - minutes, 1-2 microns thick
  - amorfous film from salivary glycoproteins
  - increases the efficiency of bacterial adhesion



2/ Plaque Formation

- Primarily Bacterial Colonization

- bacterial adhesion by single microorganisms

- extracellular polymeric substances and fimbriae, enable them to attach rapidly upon contact

- become established within 24 hours

- G+ aerobs, cocci *(Streptococcus sanguis),* G+ rods, G+ fillaments *(Actinomyces sp.)*

- immature plaque - less adherent

3/ Plaque Formation

- Growth of Plaque in next few days
- bacterial mass increases in quantity due to adhesion of new bacteria (surface receptors on G+ cocci and rods allow adherence of G- (Fusobacterium nucleatum) and synthesis of extracellular polymers
- multiplication of adhering bacteria and growth of extracellular matrix
- increasing of thickness - diffusion is more difficult - poor diffusion of oxygen - anaerobic conditions
- G- cocci, G+ G- rods and filaments (fusobacteria), aerobs and anaerobs

4/ Plaque Formation

- Maturation of Plaque

- formation of more complex and mature biofilm

- stable bacterial biofilm

- different morphotypes - cocci, motile rods, spirochetes (filamentous organisms predominate)

multiplication of bacteria, new bacterial species

- mature plaque - very pathogenic

Acquired enamel pellicle
alpha-amylase
Bacterial cell fragment
Proline-rich protein
Bacterial cell fragment
Proline-rich protein
Streptococcus oralis
Streptococcus mitis
Streptococcus sanguis
Streptococcus gordonii
Streptococcus oralis
Streptococcus gordonii
Haemophilus parainfluenzae
Propionibacterium acnes
Veillonella atypica
Actinomyces naeslundii
Fusobacterium nucleatum
Actinobacillus actinomycetemcomitans
Treponema spp.
Porphyromonas gingivalis

Perio pathogens

- Aggregatibacter (Actinobacillus) actinomycetemcomitans AAC

- Porphyromonas gingivalis
- Tannerella forsythia
- Treponema denticola

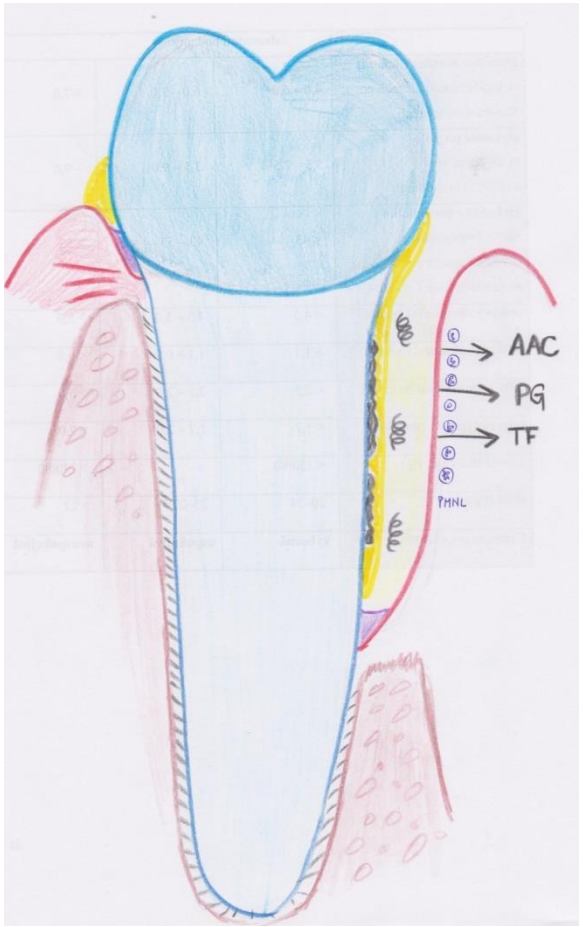
- Eikenella corrodens
- Fusobacterium nucleatum
- Prevotella intermedia

Pathogenity of plaque – soft tissue

- Bacteria in DP produce various pathological substances (direct / indirect effect)
- Direct effect

- enzymes (proteolytic enzymes colagenase, hyalouronidase)
- endotoxines (LPS of bacterial wall,)
- exotoxines (leukotoxin – AAC)

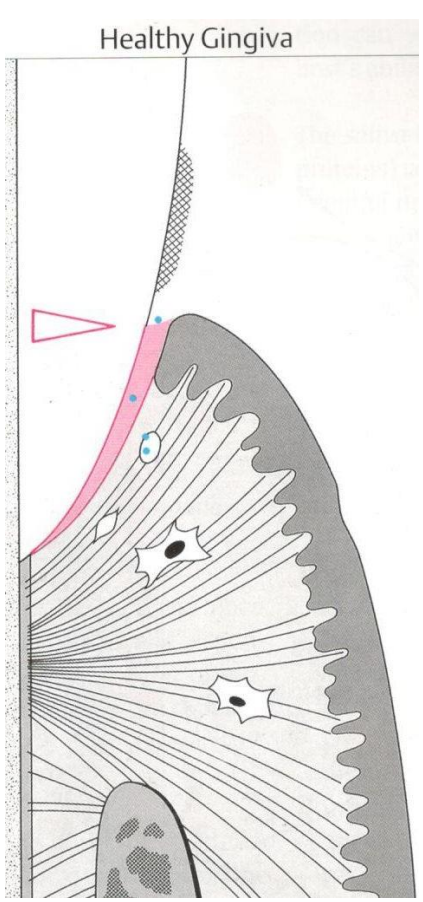
- ability to invade tissues (AAC, PG, TF)

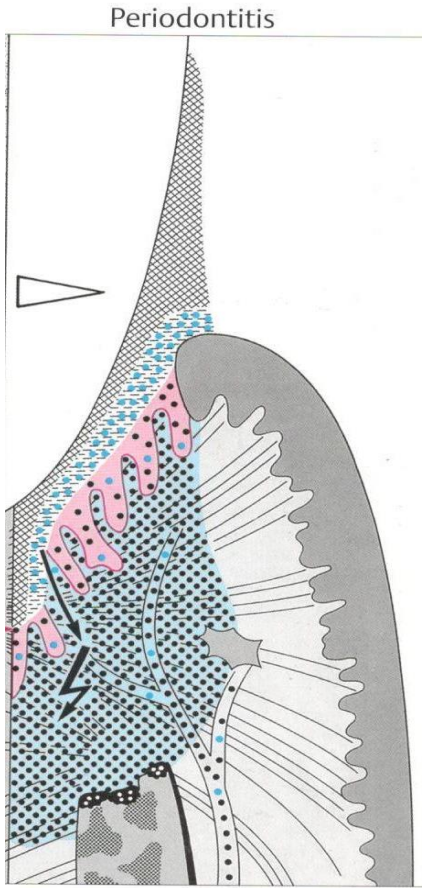


Pathogenity of plaque – soft tissue

- Indirect effect

- bacterial chemotaxins, antigens
- host inflammatory response to antigens of dental microbial plaque
- regulation of production of proinflammatory mediatores (IL –1,6, TNF, PGE)

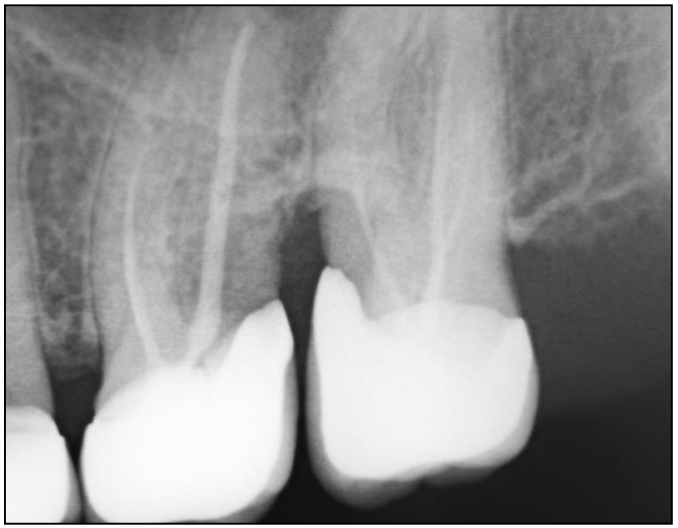




Plaque Retention factors

- Dental calculus (plaque carrier)
- Faulty restorations

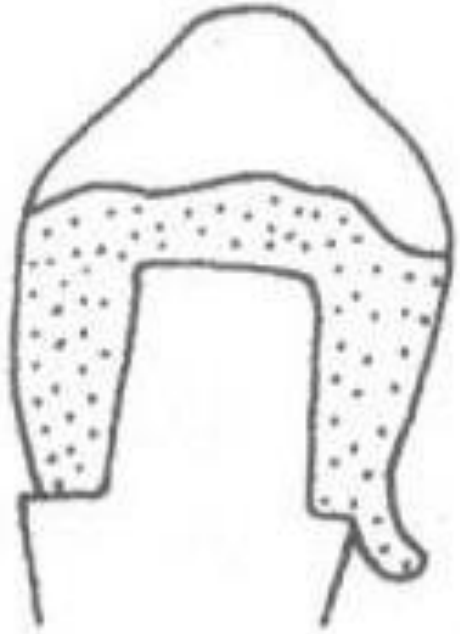
  - overhanging fillings, non-fitting crowns, conntact point !
- Orthodontic anomalies - crowded teeth, rotation, inclination
- Third molars (if not compl. errupted)
- Orthodontic appliances
- Partial Dentures



All these factors impair hygienic conditions

- Anatomical deviations of mucous membranes
  - lip frenula - shallow vestibulum,
  - gingival reccesions
- Mouth breathing, Tobacco use

a/



b/

c/

d/

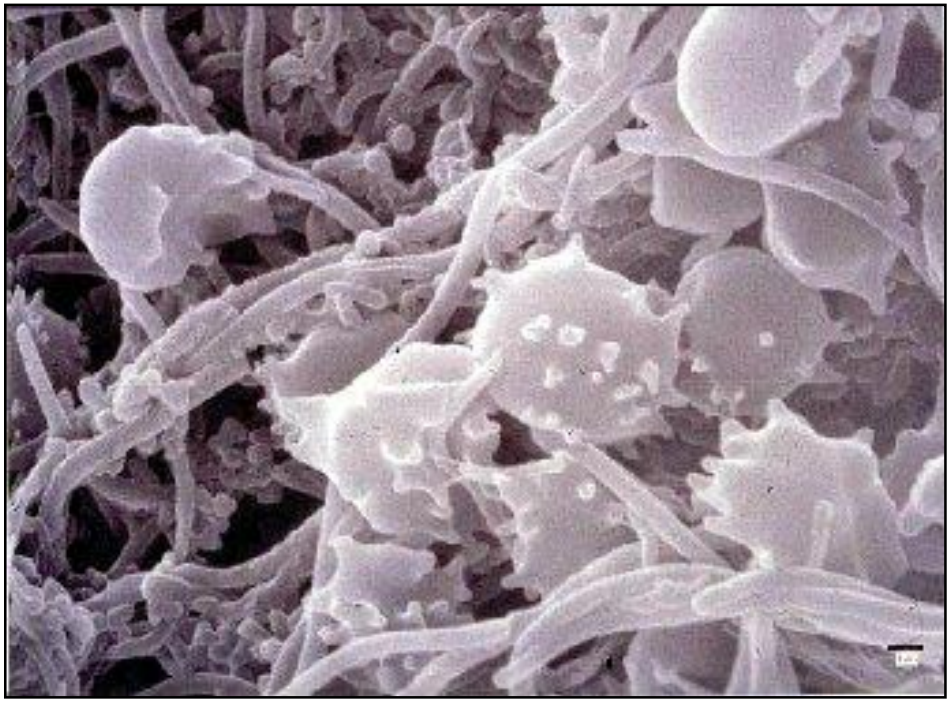
Describe the status of these fillings a-d

Which tooth has a filling that can irritate periodontal tissue?

DENTAL microbial PLAQUE

- Composition and formation rate depends on

- quality of OH
- quality of saliva
- food, smoking
- immunity



DENTAL microbial PLAQUE

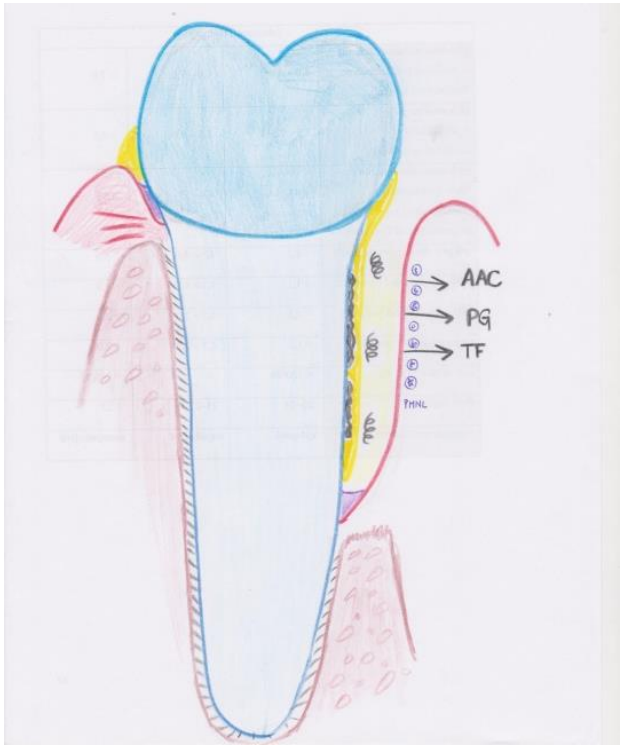
- coronar, fissural, gingival

- supragingival plaque
  - in gingival region

- subgingival plaque

  a - sulcus gingivalis of healthy periodontium

  b - periodontal pocket



DENTAL microbial PLAQUE

Supragingival plaque

- caries
- dental calculus
- increase amount of bacterias in oral cavity

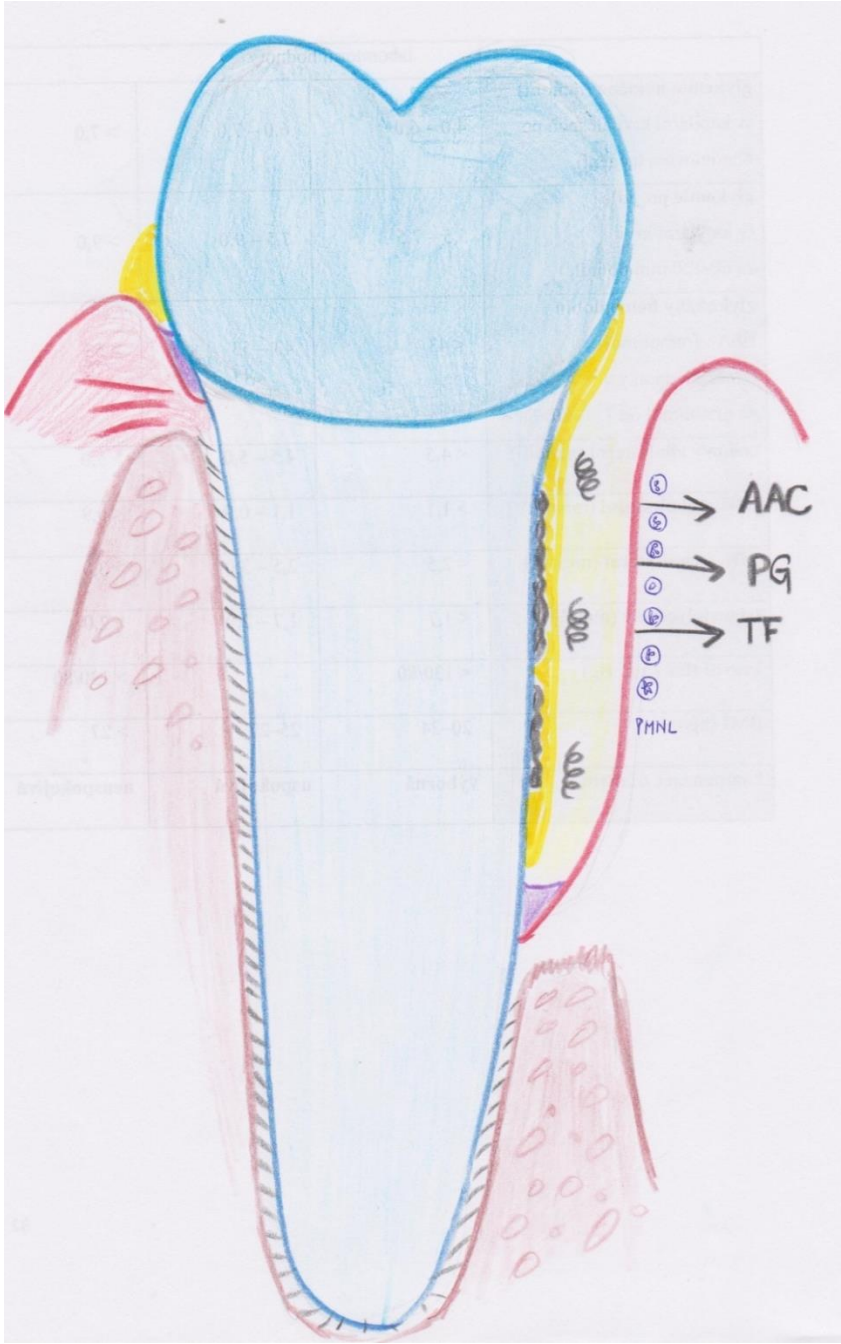
Subgingival plaque

- adherent plaque (root surface)
- non adherent plaque (swimming)
- zone of plaque near gingival epithelium

- Subgingival plaque (sulcus × pocket)

Adherent plaque (enamel, root surface)
- composition resembles the supragingival plaque (G+ and G- cocci, Actinomyces sp., rods and filaments)
- can become mineralized

Non adherent plaque - freely moving
- G - anaerobs (motile and nonmotile rods), larger number of spirochets,
- no intermicrobial matrix,
- important role in the progression of periodontitis,
- bacterial invasion (AAC, PG, TF)



- Nonspecific plaque hypothesis

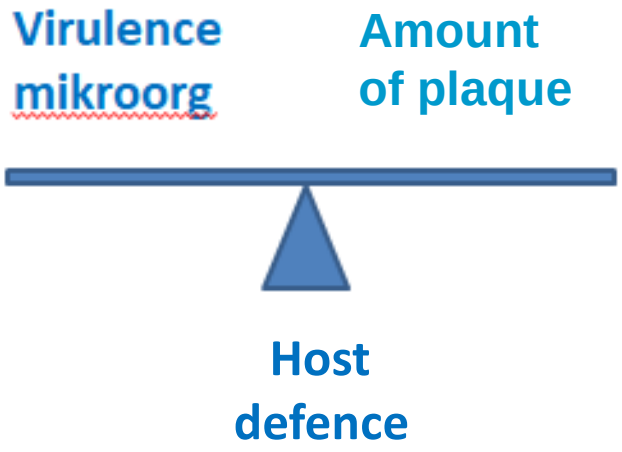
- plaque is regarded as a bacterial mass

- proliferating mixed infection

- Specific plaque hypothesis

- specific virulent bacteria in plaque cause periodontitis

- Amount of the plaque
- Virulence of the plaque
- Host defence



Host defence reaction

- Acute non-specific host response

  - first and rapid reaction

  - PMN Leukocytes

- Specific immunity reaction

  - recognition of forign antigen

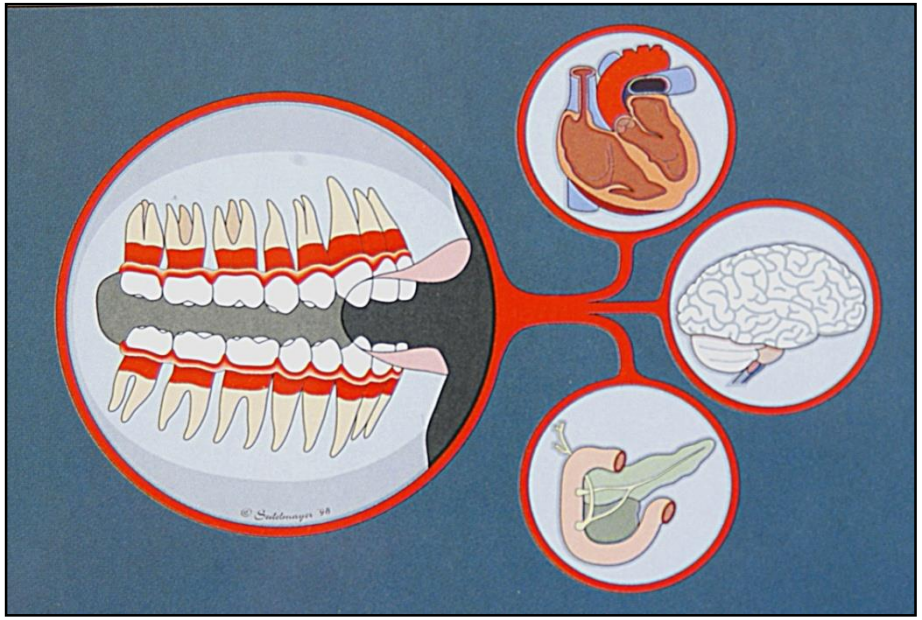
  - specific immunity reaction against this antigen

  - lymfocytes (T,B)

Dental biofilm and systemic diseases

- Bacteriemia
- Inflammatory mediators

95% of atheromas had bacterial D.N.A from periodontal pathogens



Calculus - calcified dental plaque

- Calculus is formed by the deposition of calcium and phosphate salts in bacterial plaque
- salts are present in saliva, in crevicular fluid

Calculus - calcified dental plaque

- calculus is always covered by an unmineralized layer of bacterial plaque
- good place for plaque accumulation
- reservoir and retention web for bacteria and endotoxins

Differences

- Supra - gingival calculus

- location
- the origin of minerals
- color
- diagnosis
- removing

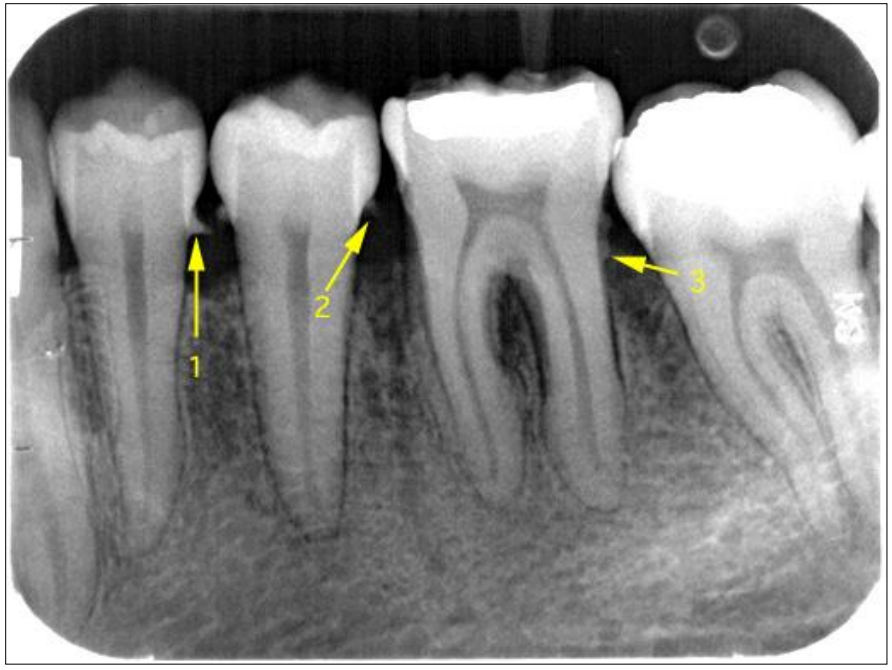
- Sub - gingival calculus

- Supragingival calculus

- Subgingival calculus

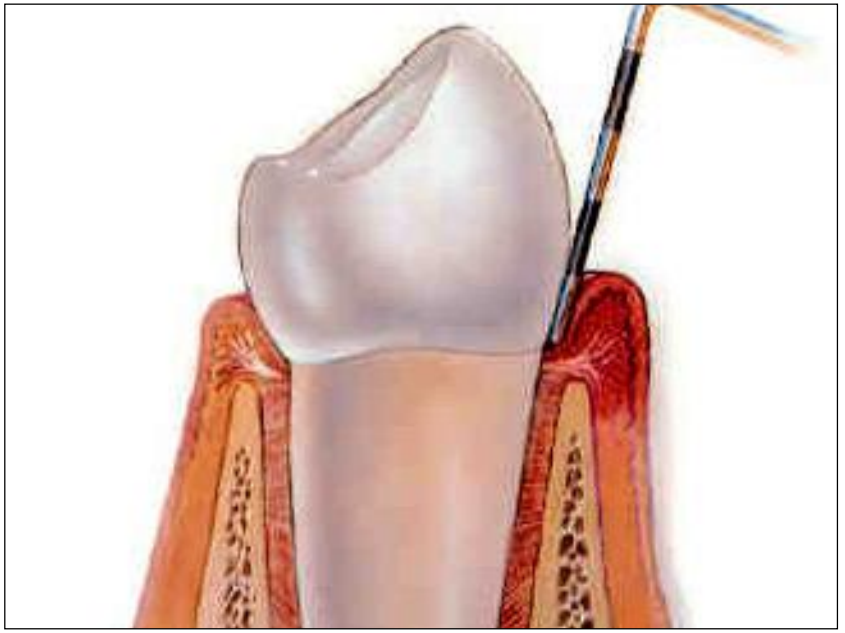
- on the root surfaces below the gingival margin

- can extend deep into periodontal pockets



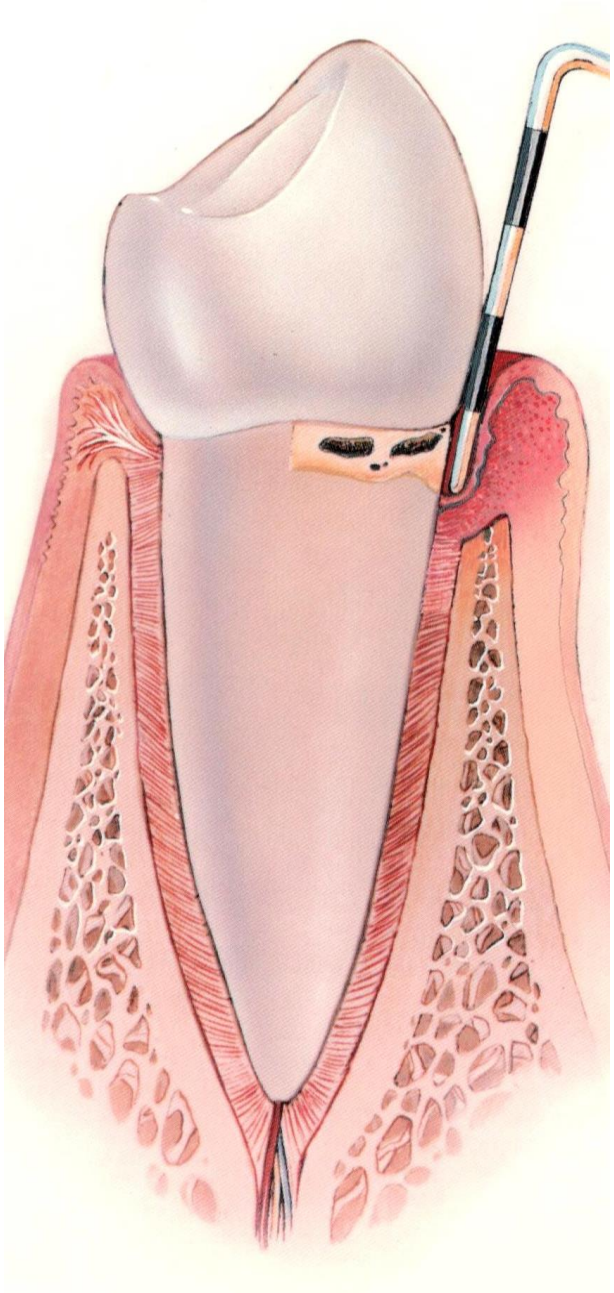
Gingivitis

- gingival bleeding
- redness to livid colour
- swelling (false pockets)
- gingiva turgor loss
- tenderness or pain



- no bone resorption !!!

- reversible

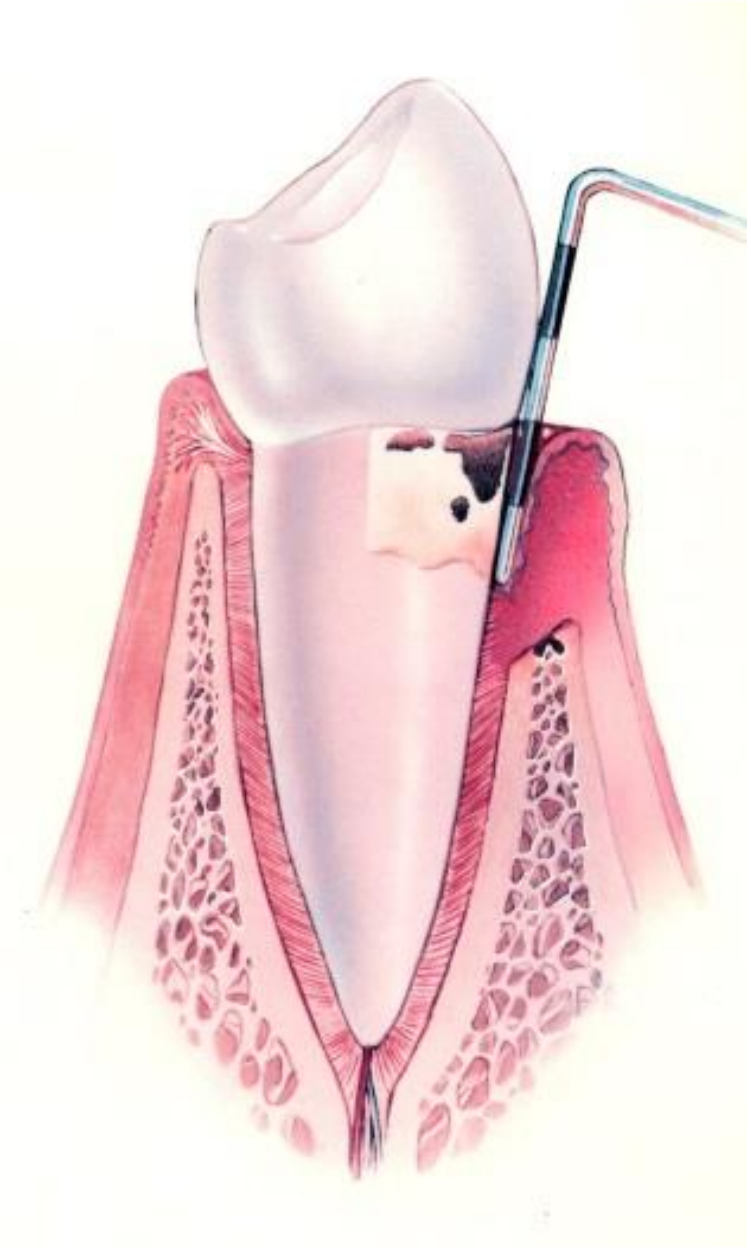


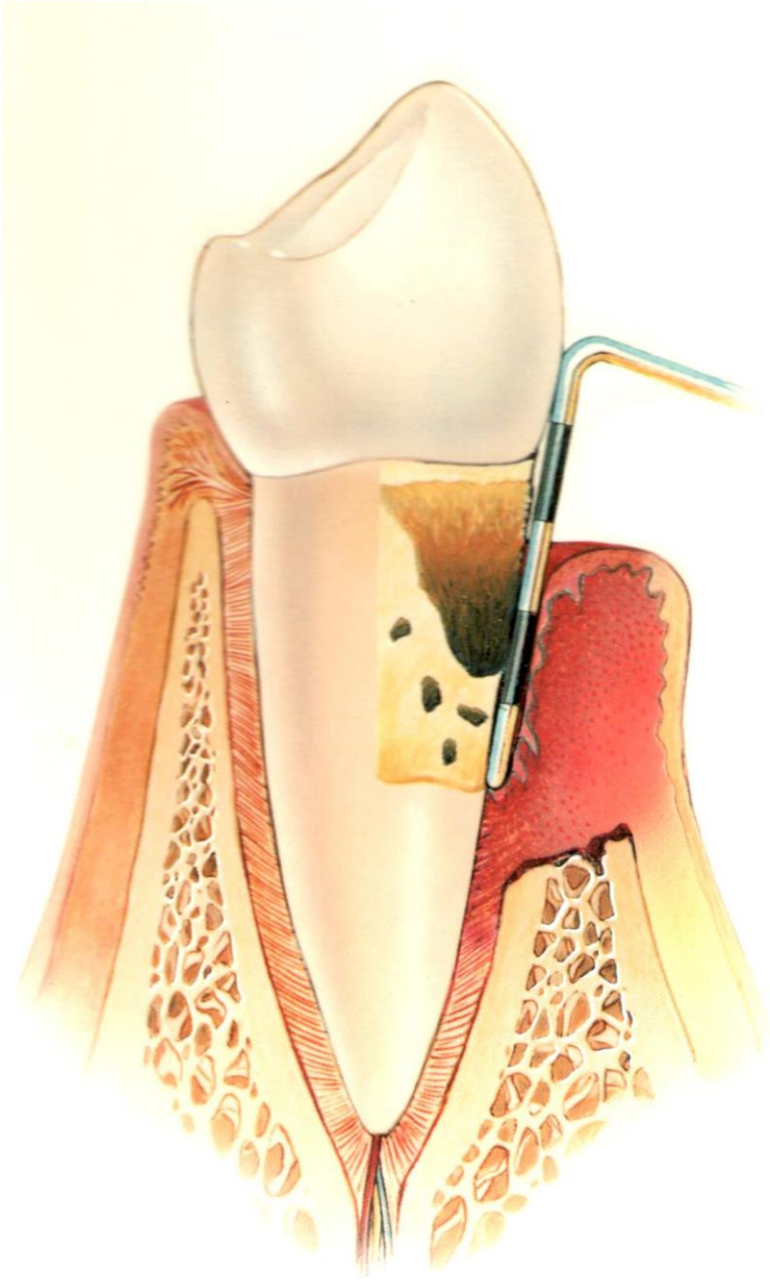
Incipient periodontitis

- Clinical symptoms are mild
- bleeding from gingiva after irritating
- oedema
- redness
- probing up to 6 mm

- Mild bone resorption

Intermediate periodontitis

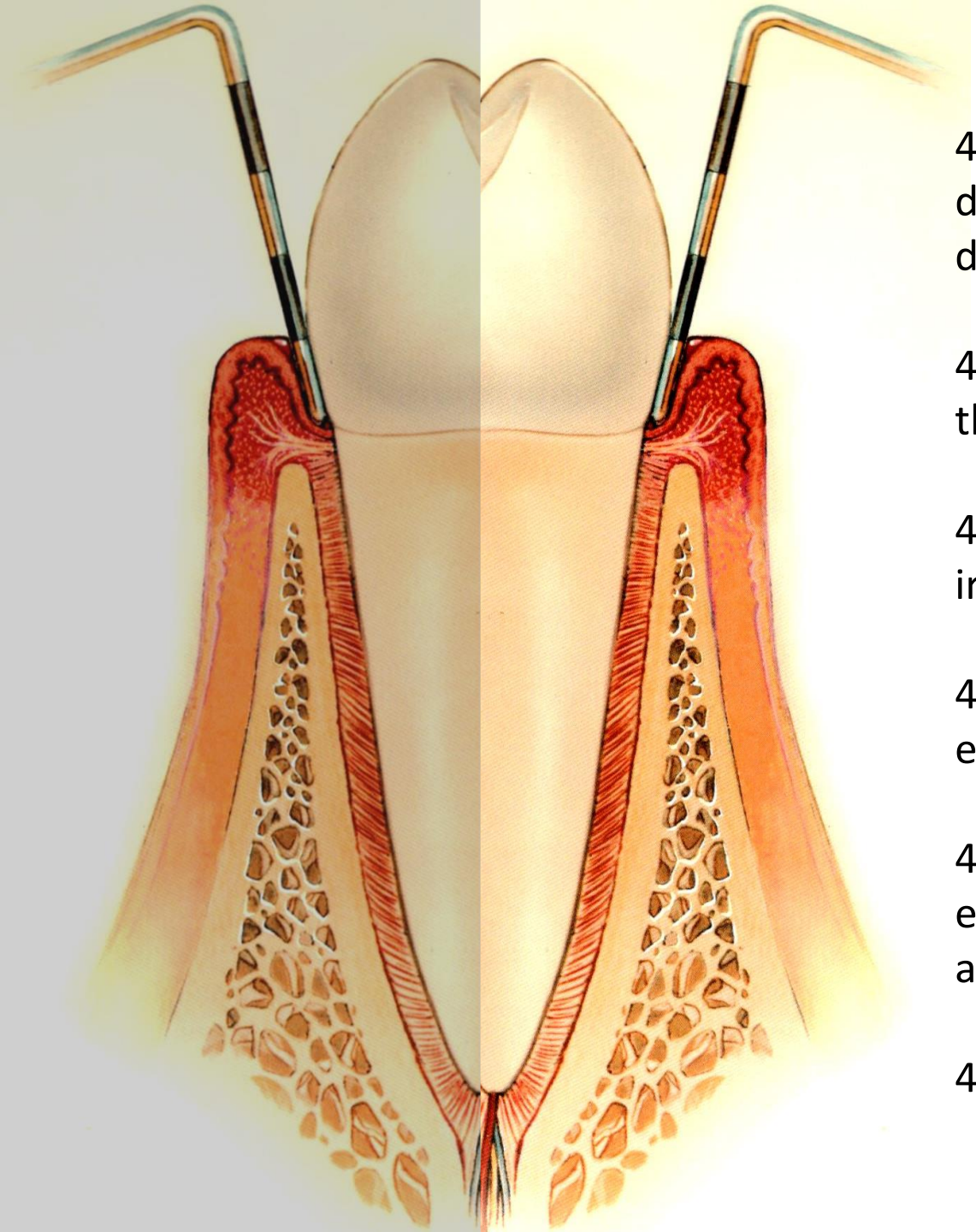




Advanced periodontitis

- deep periodontal pockets over 6 mm
- periodontal abscess
- mobility of teeth
- teeth tend to shift
- tooth loss
- bad breath

Advanced bone resorption



4a - what is the most likely diagnosis of this periodontal disease

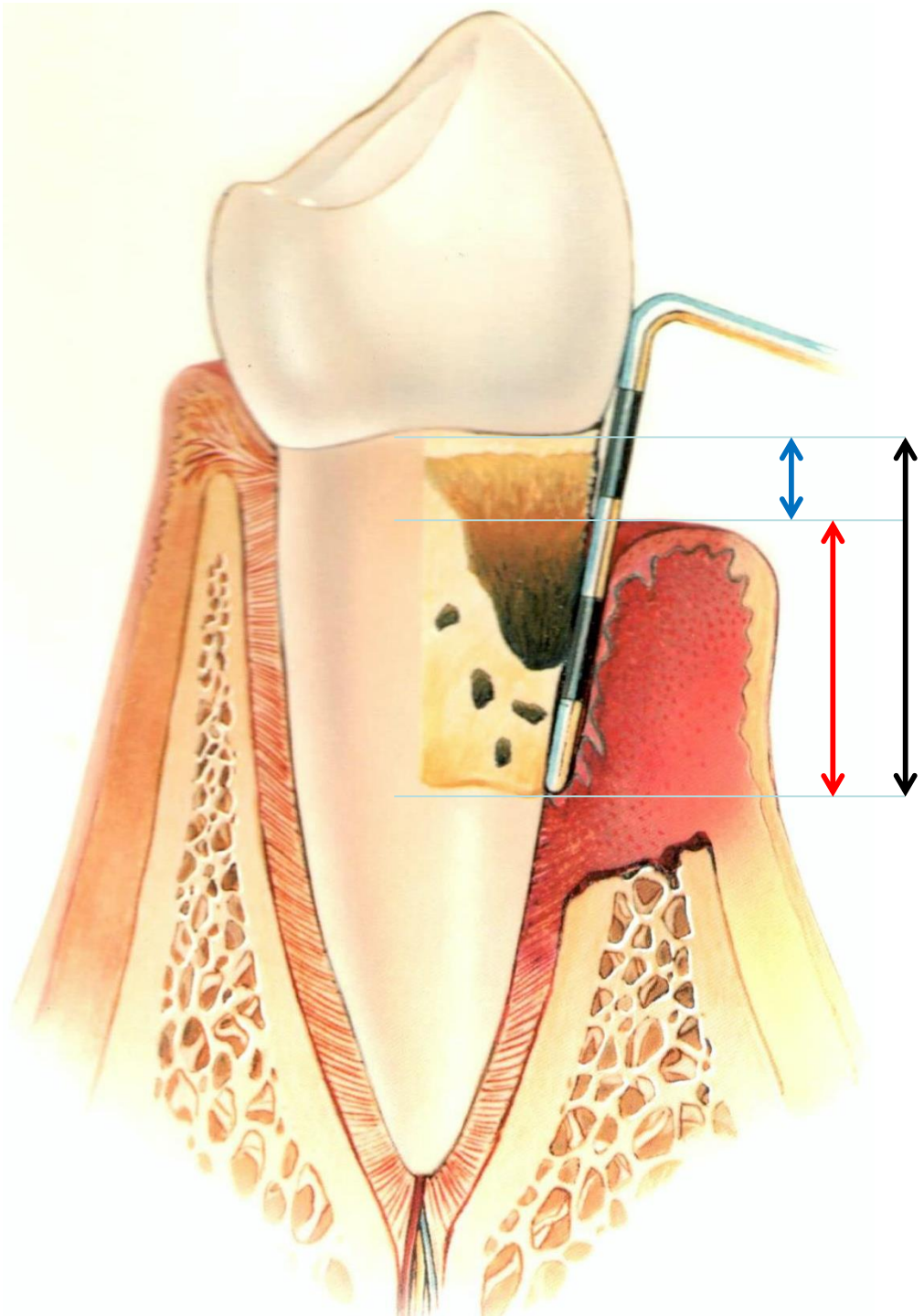
4b - typical clinical symptoms for this diagnosis

4c - is the disease reversible or irreversible?

4d - what PBI value can we expect?

4e - what CPITN value can we expect (what values are possible and what are not)

4f - what is the basic treatment?



Name the distances given by the arrows:

5a - blue arrow
5b - red arrow
5c - black arrow

Professional hygienic care

1/ Before we start with PHC

- Patient history (diseases, medication, allergies, smoking)
- Clinical examination + x-ray
- DIAGNOSIS

2/ Professional hygienic care

- Motivation
- Education – Information (picture atlas)
- OH instruction
  (with model, in oral cavity; control)

Education - Motivation

- explanation of microbial etiology
- explanation of the symptoms
- demonstration of bleeding gingiva (PBI)
- demonstration of plaque (API)

Oral hygiene instruction

- Toothbrush
- Single toothbrush
- Dental floss
- Interdental cleaners
- Toothpaste (fluorid, antimicrobial agents, anticalculus agents)
- Oral irrigators
- Mouth rinses

How to do it?

- Fones method
- Charters method
- Stilmann method
- Bass method

- Single toothbrush
- Interdental hygiene

IMPORTANCE of
ATTACHED GINGIVA !!!

Consequences of improper toothbrushing

- Horizontal toothbrushing
- Hard bristels
- Toothbrushing too frequently

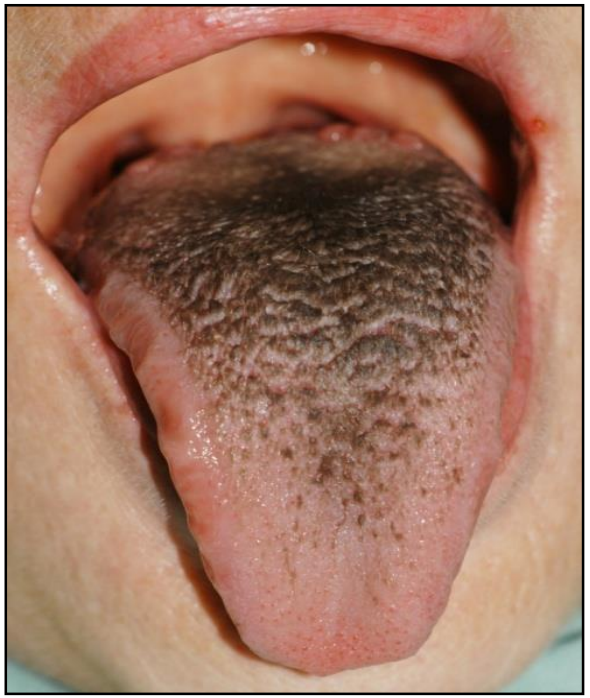
- abrasion of the tooth structure
- gingival recession
(root exposure, hypersensitivity)

Be carefur:
floss, size of ID toothbrush,
electric toothbrush

Chlorhexidinum

- against bacterias, viruses, fungals
- 0,05% - 0,1% - 0,2% in mouthwashes; gels (up to 1%) 2 times a day (once per 12 hours)
- side effects - dysgeusia, dark coloration of dorsum of the tongue, teeth and fillings, epithelial desquamation

- Adjunct during initial therapy
- Desinfection of oral cavity before dental treatment
- In handicapped patients
- Periodontal surgery



Professional hygienic care

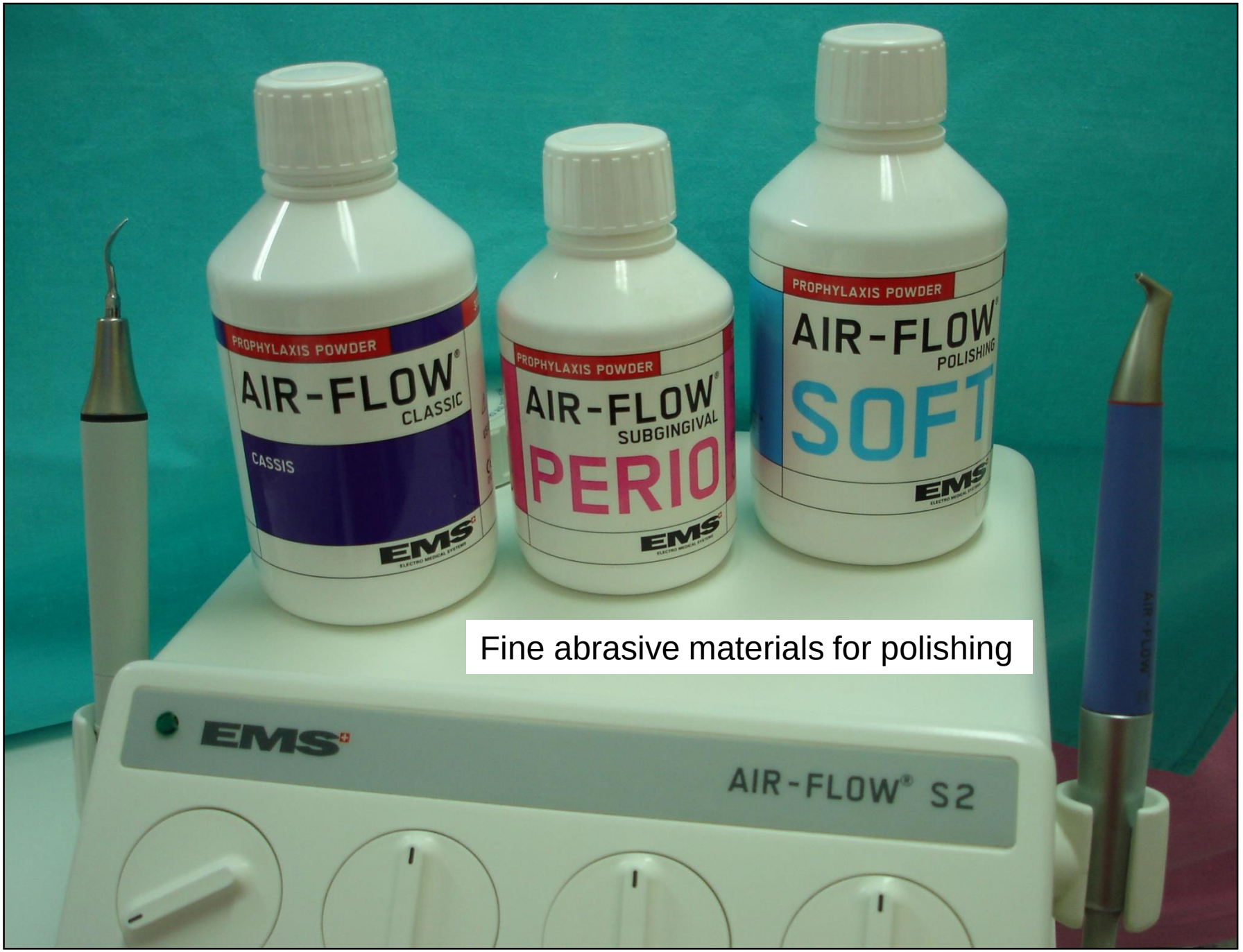
3/ Professional hygienic care

- Elimination of plaque retentive areas – (removal of iatrogenic irritants - overhangs..., reduction of naturaly occuring plaque retentive areas)
- Plaque and calculus removing
  - supragingival calculus removal (scaling)
  - scaling and root planinig (in case of periodontitis)

Polishing

RDA - the degree of abrasiveness

0 - 70 RDA	low abrasive
70 -100 RDA	medium abrasive
100-150 RDA	highly abrasive



Fine abrasive materials for polishing

Professional treatment of periodontitis

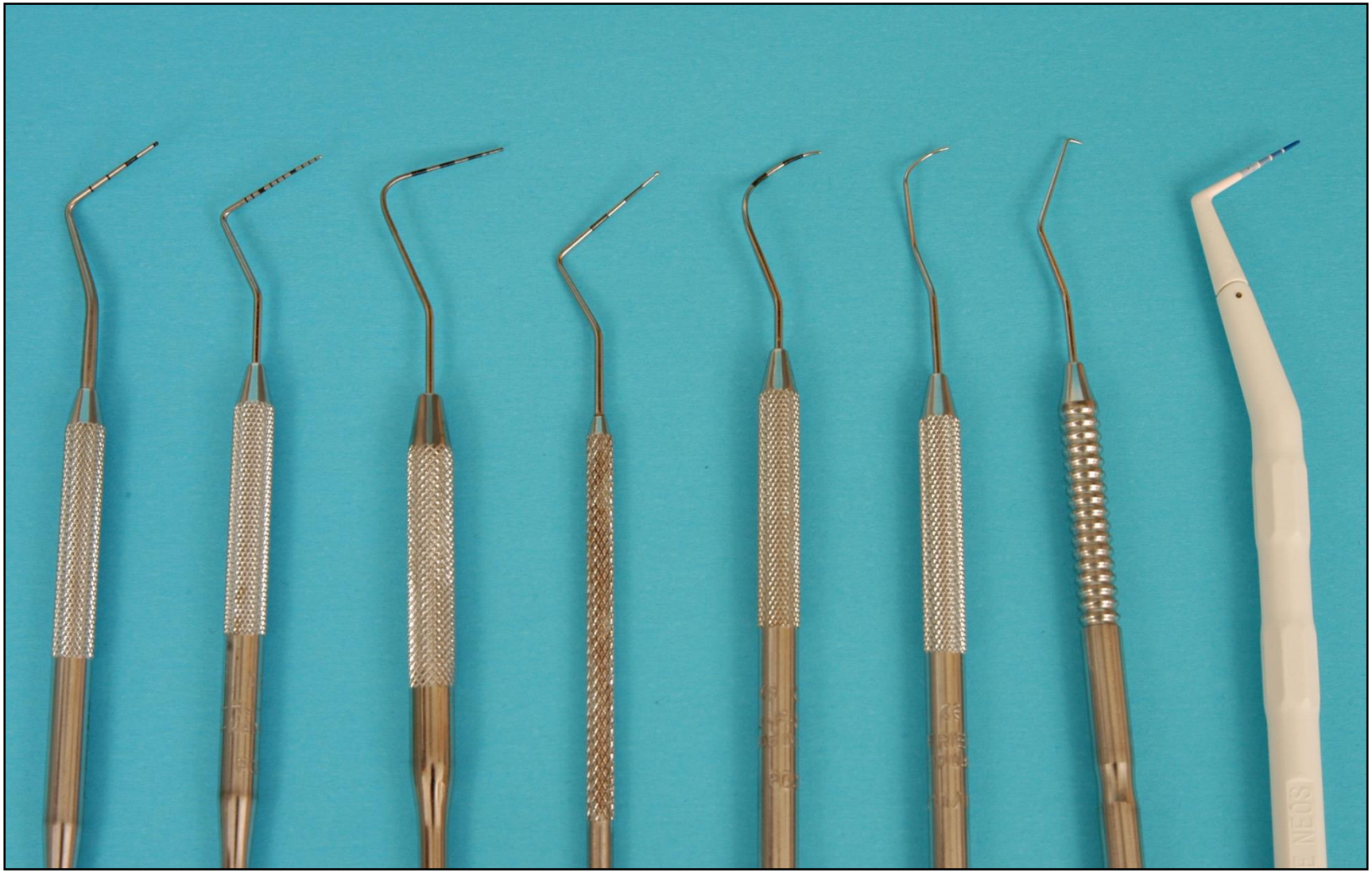
- Scaling and root planing (SRP)
  - plaque, subging calculus, necrotic cementum removal
  - Gracey c.
- Closed curettage
  - SRP + gingival wall of the sulcus removal
  - universal c.
- Perio surgery - if necessary
- maintenance treatment

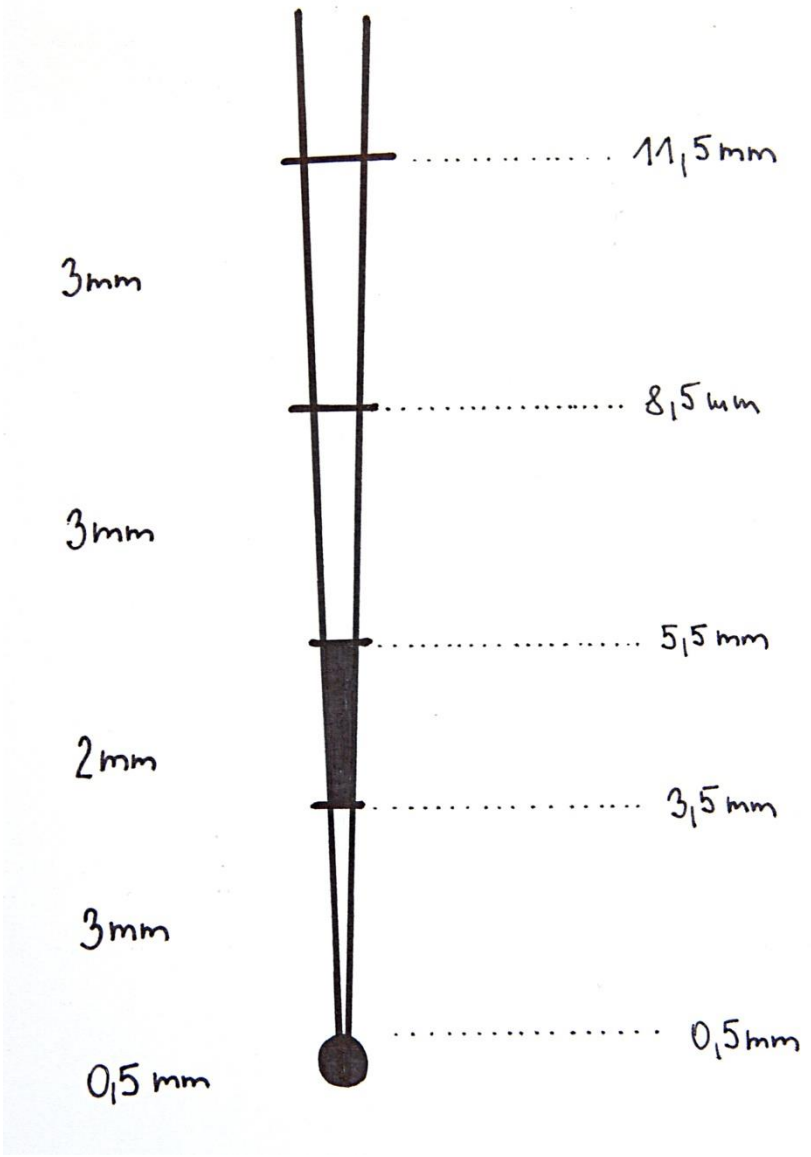
Periodontal instrumentarium

- Periodontal probes – to locate, measure and mark pockets
- Explorers – to locate calculus deposits and caries

- Instruments for scaling and root planing (closely curretage)

Periodontal probes and explorers



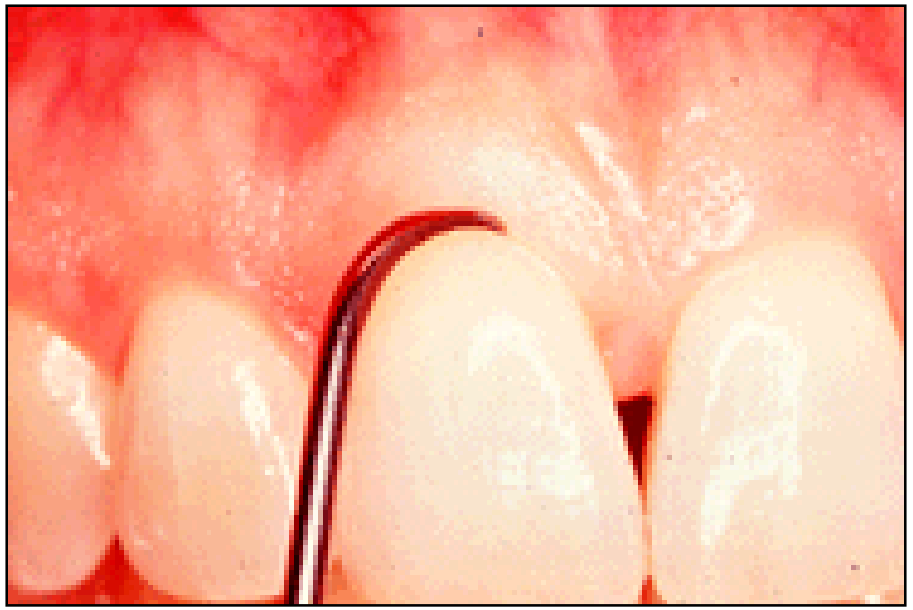

11,5 mm
3mm
8,5 mm
3mm
5,5 mm
2mm
3,5 mm
3mm
0,5mm
0,5 mm

Instruments for scaling and root planing

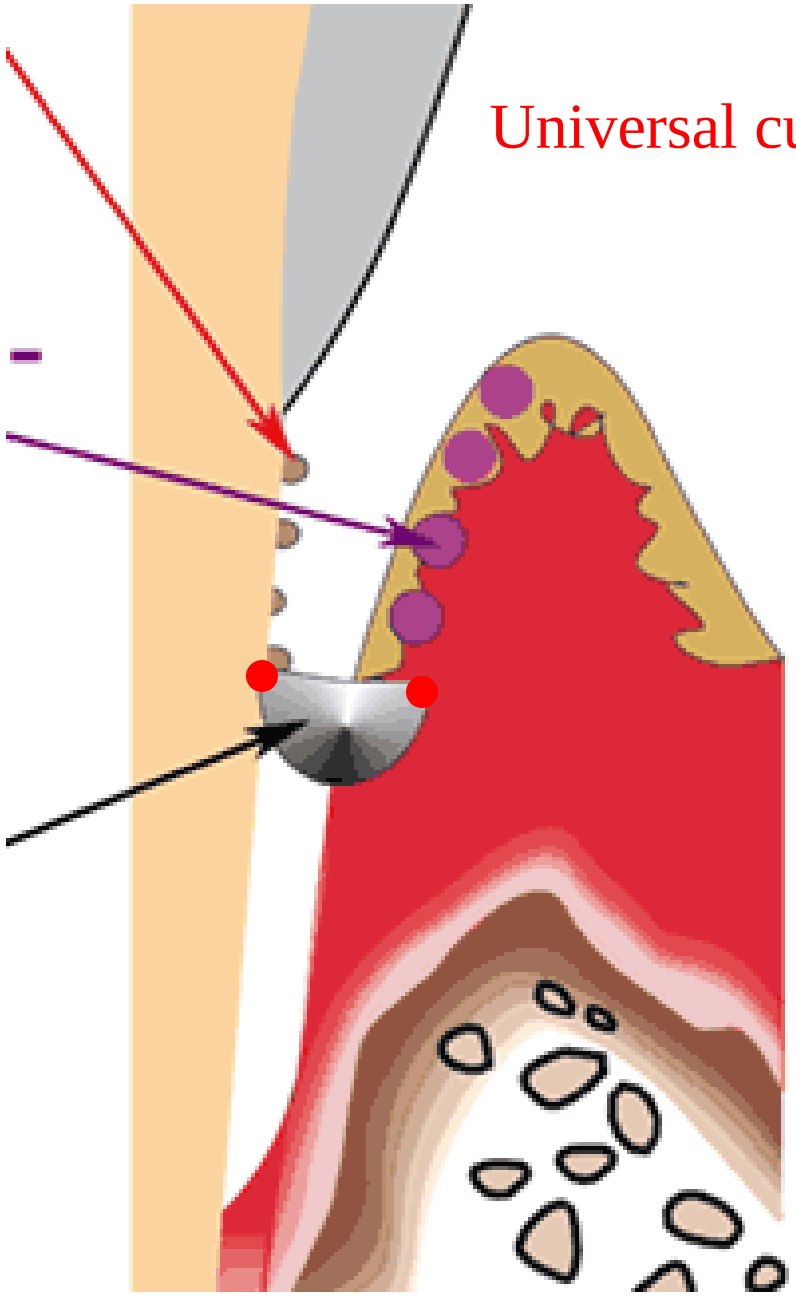
- Supragingival scaling instruments - Scalers
- Subgingival scaling and root planing instruments - Curettes (universal, Gracey)

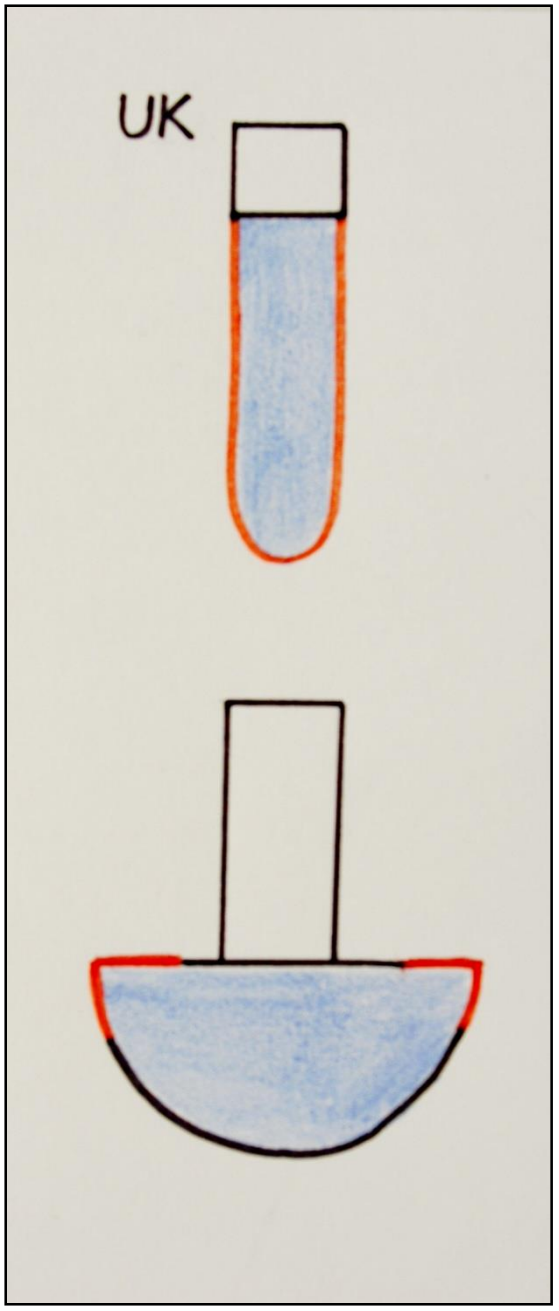
- Ultrasonic and sonic instruments
- Cleansing and polishing instruments

Supragingival scalers (sickle scalers)

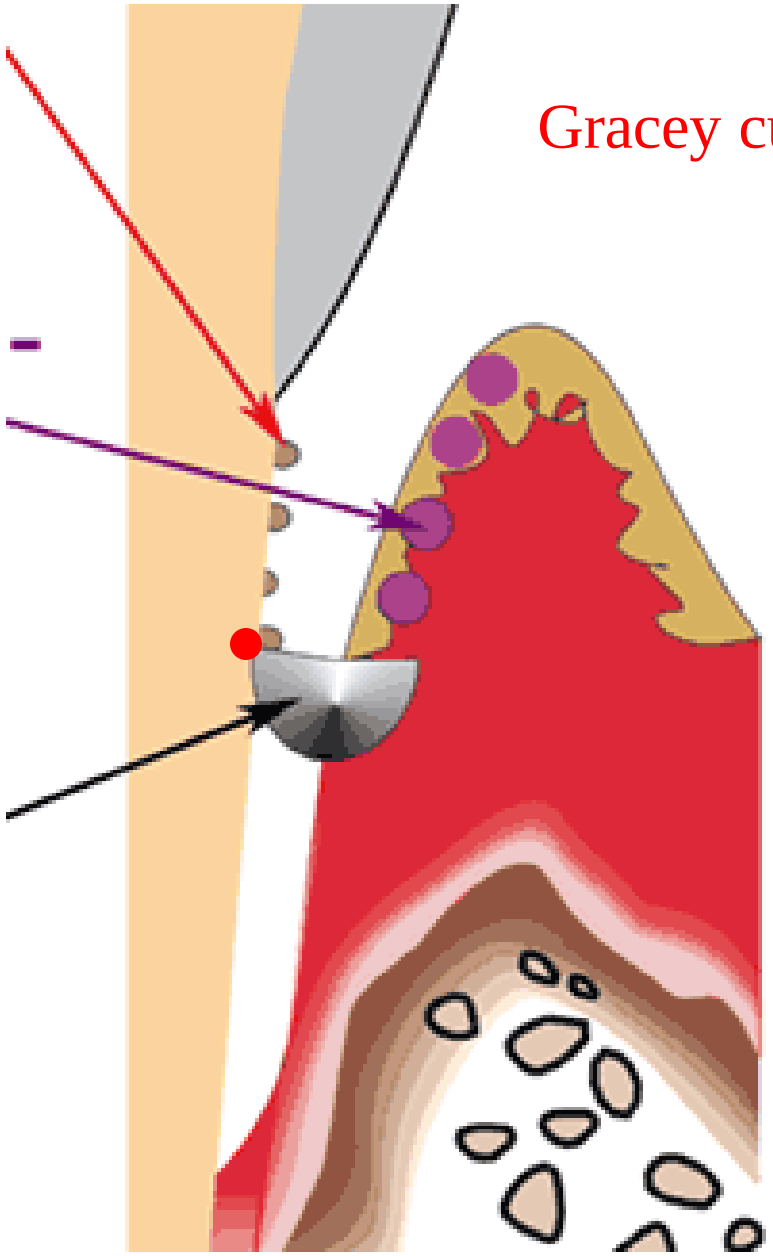


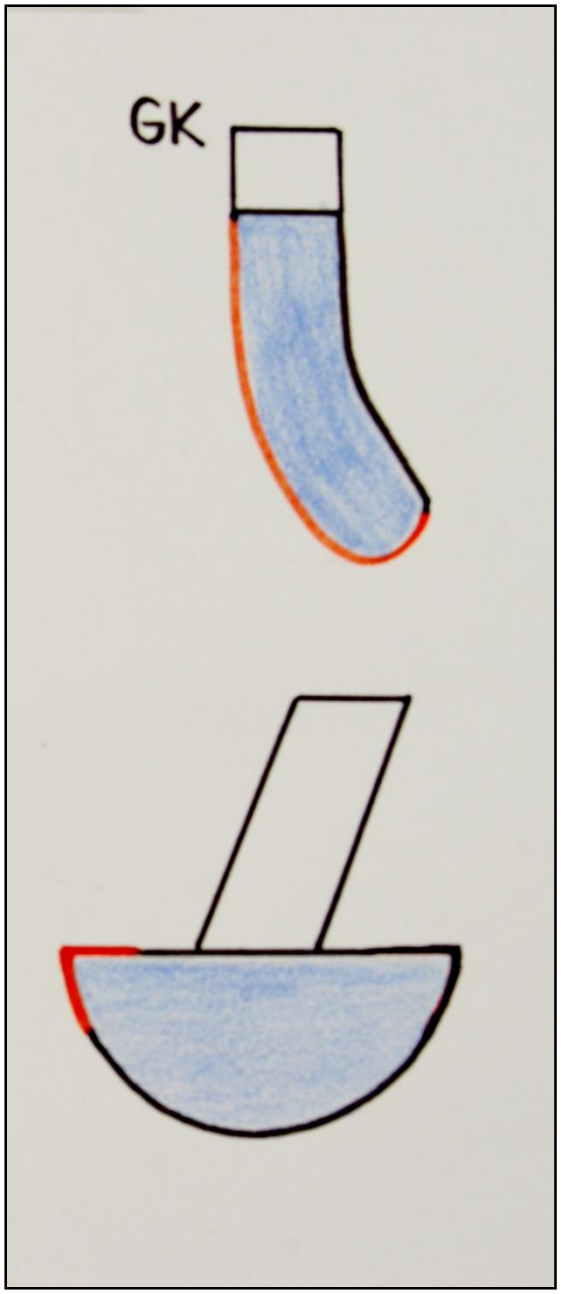
Universal curettes

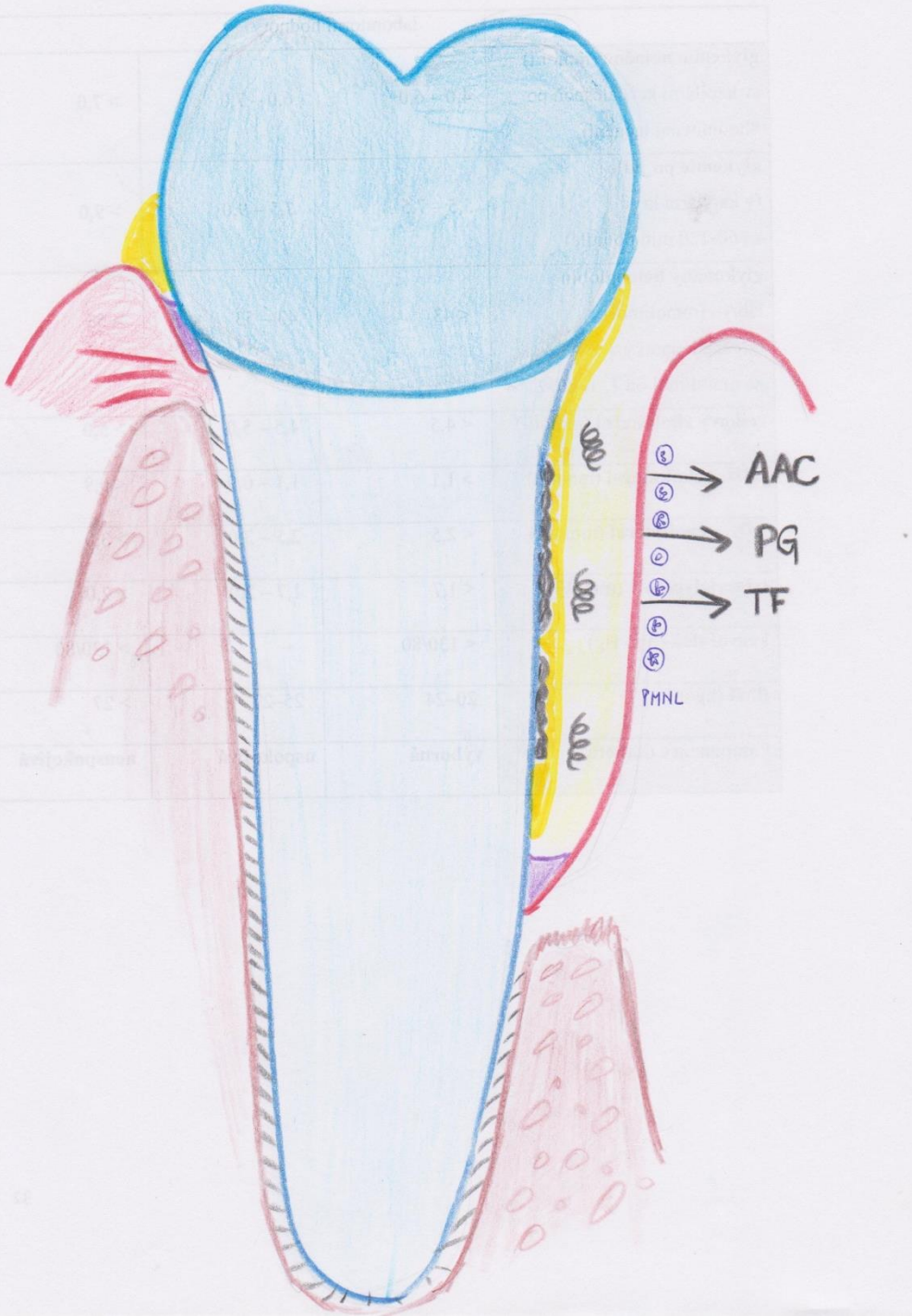




Gracey curettes






AAC
PG
TF
PMNL

Electronically powered devices

- Ultrasonic and sonic instruments

developed with the goal:

- making calculus removal easier and faster
- with less patient discomfort

- Parallel position
- No pressure
- With permanent movement
- Active part only 2 -3 mm
- Requires permanent water cooling
- Infectious spray

Comparison of S+U devices and hand instruments

- Several mechanisms of action
- One mechanism (can remove only what it touches)
- The pocket is washing out
- Some debris remains in pocket
- Less time – more time
- Light lateral pressure, relaxed grasp
- More presure, hold fast
- No sharpening required
- Infectious spray
- No at patients with cardiostimulator

Indexes in periodontology

- CPITN
- PBI
- API
- BOP

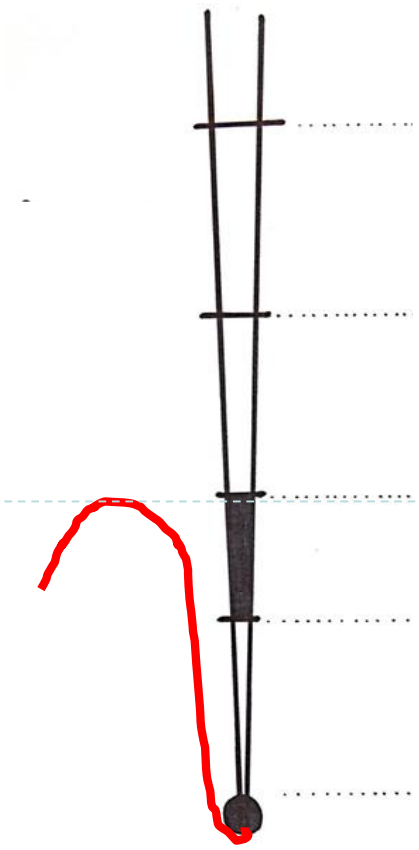
CPITN

CPITN 0,1,2
- probing depth can be 0.5/1/2/3 mm
- no pocket

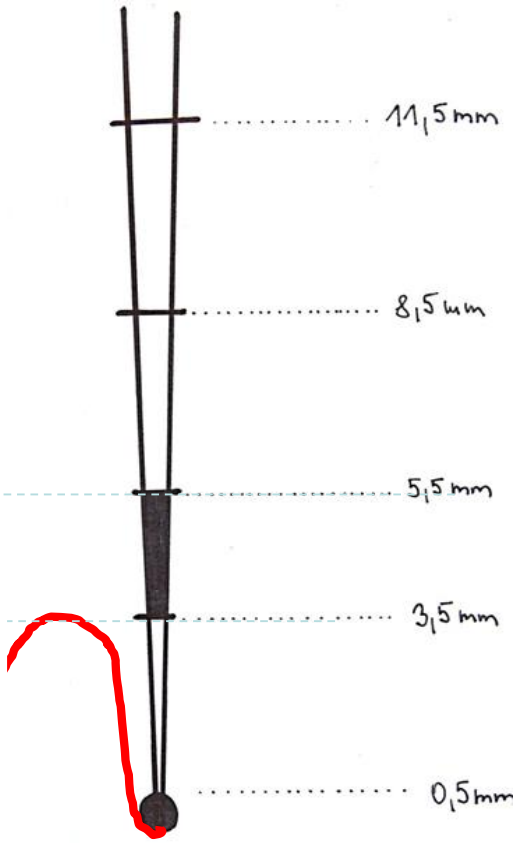
CPITN 3
- probing depth can be 4/5 mm
- shallow pocket

CPITN 4
- probing depth can be 6/7/8.....mm
- deep pocket

Probing depth 5,5 mm
CPITN 4



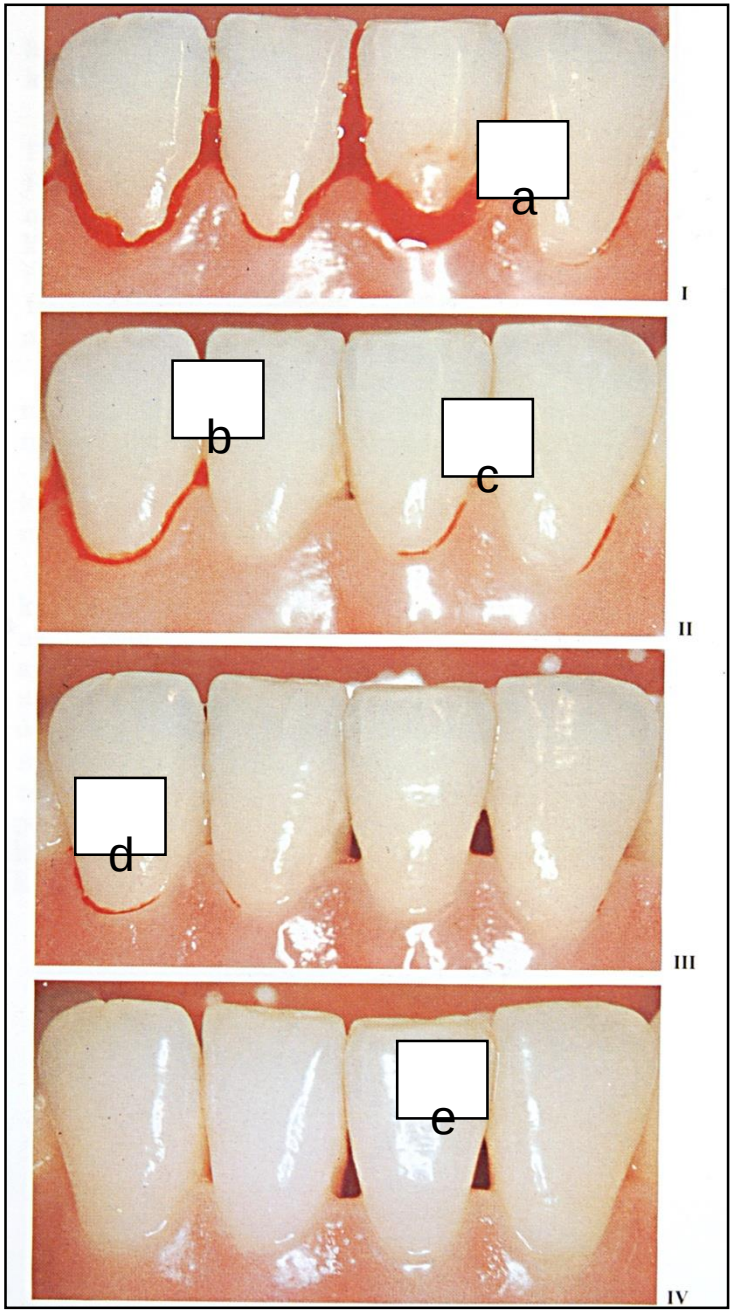
Probing depth 3,5 mm
CPITN 3



	Bleeding	Calculus	Pocket probing depth (in mm)	CPITN
1	-	-	3	0
2	-	-	3,5	3
3	-	+	3	2
4	-	+	3,5	3
5	+	+	3	2
6	+	+	3,5	3
7	-	-	4	3
8	+	+	4	3
9	+	-	5,5	4
10	-	+	5,5	4
11	-	-	8	4
12	+	+	8	4

Assign the correct PBI values to each site

What is the BOP value of tooth 33?



Is it possible to find these values as the result of the examination of one patient? Yes-no answer

PBI 4 a CPITN 000/000
PBI 0 a CPITN 434/434
PBI 0 a BOP+
API 82% a HYG 28%

In which typical cases the PBI is lower than expected?

- Dental plaque
- Formation and development of dental plaque
- Characteristics of the dental plaque as to localization
- Pathogenity of the dental plaque
- Products of dental plaque microorganisms
- Dental calculus – formation and types of dental calculus
- Dental plaque and periodontal diseases
- Dental plaque and dental caries
- Methods of tooth cleaning
- Frequency and duration of tooth cleaning
- Education of the patient – basic hygienic program
- Professional hygienic care
- Removing of dental plaque and pigmentations of exogenous origin
- Removing of dental calculus
- Removing of the iatrogenic factors
- Monitoring of oral hygiene and periodontal status with indices
- PBI index – Papilla Bleeding Index
- CPITN – Community Periodontal Index of Treatment Needs